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1553.
Michael Servetus

MICHAEL SERVETUS

A translation of his non-theological writings



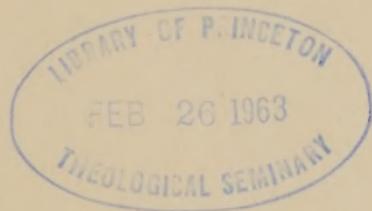
MICHAEL SERVETUS

Copper-plate engraving by Christoffel van Sichem (1607)

Michael Servetus

A TRANSLATION OF HIS
GEOGRAPHICAL, MEDICAL AND ASTROLOGICAL
WRITINGS WITH INTRODUCTIONS
AND NOTES

By
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FOREWORD

MUCH has been written about Servetus as a theologian and as an early contributor to our knowledge of the circulation of the blood, but very little attention has been paid to his remaining scientific and medical writings which have hitherto not been translated into English and, as a matter of fact, are so exceedingly rare in the original editions that they are largely unknown even in Latin. It was this situation which some years ago led the present translator to attempt rough English versions of them to satisfy his own inquisitiveness and, no doubt, with the vague notion that some day they might be revised and published. Such is now the case, and they are presented here in English translation. It should perhaps be said that at all times the aim in translation has been to produce a literal rather than an elegant rendering, and especially has an effort been made to avoid presenting an interpretation based upon what the person of the twentieth century might suspect Servetus to have meant. In some instances, as in the case of the *Syrups*, this may occasionally make for a slight difficulty of comprehension if one has no knowledge of Galenical medicine, although it is hoped that the brief introductory passages and several notes will be of some assistance. There is, however, no other way to make the translations faithful to the original texts.

A final but very pleasant task is that of expressing a great indebtedness to the members of the Department of the History of Medicine in Yale University, without whose assistance it is very doubtful whether these translations would have been published. While John F. Fulton, Sterling Professor of the History of Medicine, has long been distinguished as a scientist and humanist, it may be added

that the kindness and energies which he expends on behalf of others are apparently without any known limits. It is a very real pleasure to acknowledge the great debt which is owed to him, as well as to Miss Madeline Stanton, Miss Elizabeth Thomson, and Mrs. Marguerite Adkins, who have read the manuscript and pointed out many inconsistencies, weird usages of grammar and syntax, and generally have provided some literary quality where it was previously lacking.

All illustrations have been supplied through the kindness of the Historical Library, Yale University School of Medicine, and this volume will appear as Publication No. 32 in the Monograph Series of the Historical Library.

O'M.

INTRODUCTION

IT was precisely four hundred years ago that Michael Servetus published his *Christianismi restitutio*, a theological treatise which he hoped would be instrumental in bringing about what he considered as the restoration of Christianity. Such is the implication in the title, but, as one may readily imagine, from the viewpoint of orthodox theology of that day it was a completely heretical treatise, sufficiently so that it brought about the virtual annihilation of the entire edition and was in considerable part responsible for the execution of its author at the stake. However, the fact that three copies managed to survive the destruction meant among other things the preservation of the first description of the pulmonary circulation, and thus this book which helped to bring about its author's death has also helped to keep his name alive. However, this single book, although it is the best known and the most important of the writings of Servetus, is not his sole contribution either to theology or science. In addition to two early theological tracts which have already been translated into English, he was also responsible for several other works relating to geography, medicine and astrology, and any full appreciation of Servetus must take these also into account. Such is the justification for the English versions of them presented here.

All too frequently Michael Servetus appears to us as a child of calamity, but as we examine his career it must be confessed that much of the calamity was of his own making. It is true that he was endowed with one of the great intellects of his time, yet his thought had a decidedly dogmatic quality, and this combination of intelligence and dogmatism in turn resulted in an impatience with any

delay and an unwillingness to compromise. Servetus has been correctly described as a daring thinker, but regrettably the daring quality of his thought was accompanied by a certain lack of realism in his efforts always to gain immediate application for his thoughts. Certainly there was no realism in his tendency to explode verbal and intellectual bomb-shells which usually startled those he wished to influence into an outraged, defensive and conservative position. He appears to have had a kind of genius for indiscretion which made him at once an extremely interesting although somewhat puzzling personality and almost inevitably a tragic figure.

Very little is known about the early life of Servetus, and even during the later part of his career there are unknown periods which compel us to resort to conjecture, and while this has naturally led to a certain amount of academic dispute, the quality of mystery has also heightened the appeal which his life has for us.

It appears likely that Servetus was born in Tudela, a small town in southern Navarre, about 1511.¹ Shortly thereafter the family moved to the town of Villanueva de Sigena, with which in later life Servetus associated himself through his choice of Villanovanus as a pseudonym under which to conceal his identity. Of his early education nothing is known positively. He may have attended some church school and possibly the University of Saragossa some sixty miles distant from his home. He of course learned Latin, possibly he gained a somewhat slighter knowledge of Greek and some Hebrew.

When he was fifteen or sixteen years old Servetus

¹ At present the soundest biographical study of Servetus is that by Earl Morse Wilbur, *A history of Unitarianism* (Cambridge, Mass., 1945), pp. 49–75, 113–85. There will soon appear a full-scale monograph by Roland H. Bainton, *Hunted heretic, the life and death of Michael Servetus*.

travelled to Toulouse, which he will describe later in his edition of Ptolemy as "the mother of those skilled in law," and his legal studies at Toulouse will be reflected in his later writings by occasional references to legal and judicial procedure. It was also at Toulouse that he first became acquainted with the text of the *Bible*, and it may have been at this time that he undertook to learn Greek and Hebrew as adjuncts to his biblical studies.

Late in 1529 Servetus left Toulouse to go to Italy as a secretary to Juan de Quintana, court preacher to Charles V. At this time the Emperor was about to set out for Bologna, to be crowned there according to tradition by the Pope, Clement VII. Servetus remained in Bologna for about six months and may thereafter have accompanied the imperial train which travelled back to Augsburg for the Diet that opened in the city in June 1530. There is a gap in our information about Servetus' life at this point, and he disappears from our view until October 1530, when we find him at Basel.

Servetus had become intensely interested in biblical studies during his sojourn at Toulouse. Especially was he impressed by the contrast between the doctrine of the Trinity as he had been taught it and his reading in the New Testament of the historical figure of Jesus. His approach to all his problems was and remained a literal one, and in this instance he considered the historical interpretation of Jesus as infinitely superior to the complexities and subtleties of the Trinity. Thereafter his observation of the Church and Papacy in Italy affected him in much the same way that the young Luther had been shocked and scandalized a few years earlier. Presumably this combination of events determined him to favor the reform movement, and as that movement professed itself to be a return to the simplicity of the early church, so he hoped to influ-

ence the leaders in the direction of greater simplicity in respect to the doctrine of the Trinity.

In Basel the leader of the reform movement was Johann Ecolampadius, then forty-eight years old, a distinguished clergyman and professor at the university. None of this deterred Servetus, approximately nineteen years old, who paid repeated visits to Ecolampadius not to receive instruction, but to instruct this leading divine about fundamental dogmata of his faith. At first Servetus was received with kindness, and apparently the difference in age and experience was partly overlooked by reason of the young man's unusual intellectual endowment. Yet in time the patience of the older man wore thin. Servetus' unfortunate zeal and dogmatism, and his failure to employ the discretion which the situation called for, finally led to a breach. Indeed, Servetus was nothing loath to approach Erasmus, then living in Basel and possessor of the most distinguished position of any man of letters in Europe. Erasmus, however, refused him audience.

Rebuffed now at every turn, it was characteristic of Servetus that he did not consider that he might be in error or, if not, that the time was not ripe for his proposals. Rather he had them printed in the form of a small book entitled *De trinitatis erroribus* ([Hagenau] 1531), with the hope that the ensuing publicity would compel attention; and attention was what he got. The publication stirred up a hornet's nest in the reformed party and threatened to produce division at a time when unity was all-important. The governments of Strasburg and Basel banned the sale of the book, and one theologian went so far as to suggest the need for drawing and quartering the author.

As Servetus came gradually to realize that his action had been somewhat presumptuous and indiscreet and that he had placed himself in a position which threatened to be dangerous to him personally, he undertook to publish a

second book in 1532, his *Dialogorum de trinitate*.² Presumably this was a retraction and explanation; actually it was nothing of the sort, but rather an attempt to explain his position more clearly, and while the language of this second book was more restrained, fundamentally the doctrine was unchanged. As might be expected, the feeling aroused against Servetus remained as strong as ever, with the result that discretion finally prevailed and Servetus, rather than retract, left the reformed lands of Switzerland and Germany to vanish completely under an assumed name.

Servetus appears to have gone either from Basel or Hagenau to Lyons, where he gained employment in the active printing and publishing trade of that city, probably as a corrector of the press. In the course of this move he disguised his identity by the adoption of the name Villanovanus, a reference to his early home at Villanueva in Spain. For the next twenty-one years Servetus remains unknown and a new person, Michael Villanovanus, has taken his place.

After a residence of several years in Lyons, presumably as corrector to the press of the brothers Melchior and Gaspard Trechsel, Servetus proceeded to Paris, where he enrolled and studied for some time at the Collège de Calvi. What his studies were is unknown, but it seems unlikely that he began any medical studies at this time. More probably he was devoting his efforts to mathematics and astronomy, and he may already have been preparing the edition of Ptolemy's *Geography* which was to be published in 1535 under his editorial direction. It was certainly dur-

² Both this and preceding tract on the Trinity have been translated by Earl M. Wilbur, *The two treatises of Servetus on the Trinity* (Cambridge, 1932). For the bibliography of these as well as all the other writings of Servetus, see the forthcoming bio-bibliography by John F. Fulton, *Michael Servetus, humanist and martyr* (New York, Reichner, 1953).

ing this first visit to Paris that he observed Francis I touching those afflicted with scrofula, which he mentions in the *Geography*, expressing strong doubts about the efficacy of the treatment. His remarks on the University of Paris are also a fruit of this visit.

I

PTOLEMY'S GEOGRAPHY (1535)

SOME time in 1534 or 1535 Servetus returned from Paris to Lyons. Quite possibly he had exhausted his funds and so turned to his old occupation as corrector of the press, although it is also possible that he had already been engaged on the Ptolemy and was now returning to Lyons to see it through the press. At any rate, it was at some time during this period that he undertook to edit an edition of Ptolemy's *Geography* for the brothers Trechsel, then the most famous publishers in Lyons.

This *Geography*, the standard work on the subject since the second century, had been translated from its original Greek text into Latin c. 1410 by Giacomo d'Angelo, and this version, first printed in 1475, despite its many faults, long remained the only available Latin version. However, in 1524 Bilibald Pirckheimer, the celebrated German humanist, had completed a new translation which was published in Strasburg in the following year. The Greek text was first published in Basel in 1533 with a preface by Erasmus, although without any further indication that he had had any part in the editing of the text. Servetus mentions both Pirckheimer and Erasmus in the introductory letter to the reader in his edition, so that we may assume that he made use of Pirckheimer's new Latin version and compared it with the Greek text. This is further borne out by the title, which runs in part, *The eight books of the account of geography of Claudius Ptolemy of Alexandria. Edited according to the translation of Bilibald Pirckheimer but compared to the Greek and early editions.*

A new edition had apparently been justified by the

great and continued popularity of the *Geography* as well as numerous errors in Pirckheimer's edition, to which matters Servetus calls attention without undue modesty in his introductory letter. His emendations, however, in large part justify his claims, and later geographers, such as Sebastian Münster (1540), Abraham Ortelius (1596) and Petrus Montanus (1605), have acknowledged his merits.¹ While it is perhaps a little extravagant to claim for him the title of founder of comparative geography, yet his comparison of the French and Spanish characters and his efforts to depict what might be called national psychologies were certainly a novelty for that time. Despite the introduction of a certain amount of original material, Servetus retained much of Pirckheimer's text, and it was tragically ironical that at his trial in Geneva in 1553, a charge of blasphemy was made against him on the basis of a sentence in his description of Palestine to the effect that the "promised land" was not a land of promise insofar as modern climate and soil were concerned. This remark, deleted from the edition of 1541, had been retained from Pirckheimer's Ptolemy, where it constituted a borrowing from the still earlier edition of Lorenz Fries (1522).

The sections given in translation are the most interesting, original and fullest contributions of Servetus to his edition. While he made minor alterations in the other accounts which he borrowed from earlier editions, they are not, however, of significant enough proportion to warrant their inclusion here.

¹ The various commendations have been gathered in Eloy Bullón y Fernández, *Miguel Servet y la geografía del renacimiento* (Madrid, 1929).

CLAVDII PTOLE
MÆI ALEXANDRINI
GEOGRAPHICÆ ENAR.
RATIONIS
LIBRI OCTO.

EX BILIBALDI PIRCKEY MHERI
tralatione, sed ad Graeca & prisca exemplaria à Mis
chaële Villanouano iam primum recogniti,
Adiecta insuper ab eodem Scholia,
quibus exoleta urbium nos
mina ad nostri secu
li morē expo
nuntur.
*

QVINQVAGINTA ILLAE QVOQVE CVM
veterum tum recentium tabule adcluentur, quæ
incolumis ritus & mores
explicantur.



L V G D V N I
EX OFFICINA MELCHIORIS ET
GASPARIS TRECHSEL FRATRVM
M. D. XXXV.

The Eight Books of the Account of Geography by
Claudius Ptolemy of Alexandria.

Now for the first time edited according to the translation of Bilibald Pirckheimer, but compared to the Greek and early editions by Michael Villanovanus. Scholia have been added by the editor in which the obsolete names of cities have been given according to present usage.

Also fifty maps have been added of the ancient as well as more recent times and the various rites and customs of the peoples are described.

Lyons

From the shop of the Brothers Melchior and
Gaspard Trechsel

1535

*Michael Villanovanus
to the Reader²*

It may not be amiss, friendly reader, to prefix a few remarks concerning our Claudius and to explain precisely what we have attempted to do in this edition. Ptolemy was a native of Alexandria, royal city of Egypt, and was well versed in Greek letters with which Egypt was then imbued, although he also spent some time at Rhodes. He was a philosopher and astrologer as well as a capable mathematician as, indeed, his other writings attest. He flourished under the emperors Trajan, Hadrian and Antonius Pius. His skill in surveying so vast a world was greater than the glory of Hercules, as invading the earth without war he compelled it to be assessed according to a kind of rule and delivered over to us with a description for our enjoyment. And not only did he do this, but he joined the heavens to the earth, combining the measures of them both into one. He was later than Strabo, Pliny and Pomponius Mela, but he easily surpassed them, and all earlier, in the profession of geography. We shall employ all our strength and efforts to the utmost extent to emendate corruptions and explain those things which he has disclosed, a labor in both cases dangerous but worthy and not heretofore attempted by anyone; and may we be pardoned if anywhere we have not done sufficient for the reader. There is one matter about which I cannot be silent. From other editions, Greek as well as Latin, and by assiduous reading of other authors, we have restored many thousands of places, and it would be worthwhile to compare some of these places in some of the sections so that a specimen of our discrimination might

² The present translation has been made from the translator's personal copy of the 1535 edition. There is a Spanish translation by Dr. José Goyanes Capdevila, *Descripciones geográficas del estado moderno de las regiones en la geografía de Claudio Ptolomeo Alejandrino por Miguel Vilanova (Miguel Serveto)* (Madrid, 1935).

be displayed. But the examples of one, Narbonensis Gallia [Provence], will suffice. In book II, chapter 10, table 3 of Europe, there is a city which was formerly read as Chetira, although according to the Greek edition it ought to have been read Baetira, which is the city of Biterrense commonly called Beziers; Stephanus also called it Betarra, and Mela, Pliny and Strabo, Blitera. In the same edition there was read Fossae Mariana, although all the aforementioned writers attest that it was Fossae Marianae, from the Roman consul Marius, which is now called Aquae Mortuae [Aigues Mortes]. Likewise in one edition was read the river Sicarus, in another Tisara, although it should have been read in neither fashion but Hisara whether one examines a Greek edition or the writings of others, and especially the commentaries of Caesar. Also the modern name which the same river has in the vernacular [Isère] agrees with this. Nor may I be silent over the fact that there are those who in the same editions have written Anar for the Arar [Saône] river, and Buden for Dubi [Doubs], Cepero for Cessero [Castres], Loavenniorum for Avenniorum Colonia [Avignon], and Sempes Pupulos for Sentiis which today is called Dignenses [Digne]. Also Colonia Cabelliorum which forms the two Massilias [Marseilles], the one Greek [Marseille], the other not Greek [Toulon], was omitted. Moreover, there the river is read Orobias which by others is called Obris. Also if it be permitted, we would emend the site of Tolosa [Toulouse] which is situated on the Garumna [Garonne], not on the bank of the river Iller. Lest I be tiresome to any, I shall say nothing here of the degrees of longitude and latitude which I have corrected since they are sufficiently clear by reading and comparison.

In this matter we have not departed from the purpose of Ptolemy but have merely corrected the errors according to the earlier exemplars of the books. To the eighth

book which, if we may believe Bilibald [Pirckheimer] and Erasmus, needed correction more than the others, we have adjoined a brief annotation by which, if the whole book were destroyed, anyone even slightly skilled in mathematics would be able easily to measure the length of the longer days and the distances from Alexandria, not only of the cities described there by Ptolemy but of any others. Likewise it ought to be known that the arrangement of the sites [of cities], sometimes altered, was not the same in the tradition of Ptolemy and in our interpretation, since a transposition of places sometimes occurred after his time so that today the German peoples have been placed on the map of Belgic Gaul between the Nemeti and Vandiones; and on that of Italy between the port of Liburnum [Livorno] and the Populonian promontory or city of Populonium [Piombino] on the Tyrrhenian Sea. We have given the true names in the margin; but in the order in which Ptolemy proceeded those which he placed first ought to be last. On the same coast there is a transposition between Telamon [Talamone], Hossa [mouth of Marta R.] and Cossa [Orbetello]. The same thing occurred in regard to the names of the mountains of the Alps as Andreas Alciatus noted in his Tacitus.³ Jacobus Bracellius⁴ teaches us another order on the coast of Liguria than that of Ptolemy. But so much for those things which have been read incorrectly.

Then we have added scholia by which reading may be made more clear, pleasant and full, and how much aid they may bring to the reader will be judged by those who try the experiment of reading. In the course of Greek and Latin poems, descriptions and other writings, when the

³ Andrea Alciati, 1492–1550, the Italian humanist and jurist whose first annotated edition of Tacitus was published in 1517.

⁴ Giacomo Bracelli, 1390 (?)–1466, historiographer of Genoa, whose *Liguria descriptio* was published in Paris, 1520.

discourse, as very often happens, turns upon regions, cities, mountains and rivers, if one then consults our Ptolemy the names of the cities joined to the ancient names of the poets and adjusted to the speech of our times will undoubtedly bring some pleasure to the reader, since formerly the reading of Ptolemy without annotations was not very pleasant. And that we might turn the minds of young men more to this reading we have explained most names of cities in the maternal tongue as easier to understand, so that we may seem to speak with the Germans in German, with the Italians in Italian, and with the Spaniards in Spanish; we have seen all these lands and we know the tongues of all of them. In rendering the names of the cities into the vernacular speech we have relied as much as possible on the authority of writers, on experience and on the most certain conjectures. In addition, we have passed over in silence many of those which have been described by Ptolemy, since they have been destroyed. But when other cities arose in the same or a nearby place to those destroyed, we have substituted the new one in place of that described as destroyed, but in the margin, for we wanted Ptolemy's text to remain inviolate. This work of ours will contribute greatly to the knowledge of the provinces of the earth and to the comparison of the present with the past, a pleasant exercise which, unless I am mistaken, will be denied by no one unless some shameless Zoilus [i.e., critic] who is unable to regard the labors of others without malice. Whoever you may be, gentle reader, I hope that you will suffer our efforts as acceptable and worthy.

Farewell.

Britain and Ireland

The island of Britain is divided into England, Wales and Scotland. Wales, which is also called Cambria and the people Welsh, is subdivided into Cornubia or Cornuvallia,

which is called Cornwall by the natives, as far as the promontories which Ptolemy calls Damnonium and Ocrinum [i.e., the Lizard], and he calls these people Cornish.

Likewise in that part which is between the Bristol estuary and the river Dee, there is a certain region called Venodocia, today North Wales and the people North Welsh, that is, northern Wales, called by others Norgales; and another region or province called Demicia, today South Wales and the people South Welsh, that is, southern Wales; and another province called West Wales, that is, Wales of the west and the people West Welsh.

One king rules England and Wales, another, Scotland. The island is situated in the ocean between north and west, surrounded on all sides by the sea, nowhere joined to the Continent but divided from all land. This was first called Albion from the white cliffs which appear first to those sailing thither. Afterward it was called Britain by Brutus, son of Sylvius Posthumus, king of the Latins, and leader of certain Trojans who forty years after the destruction of Troy by the Greeks came to this island in a fleet and killed to the last man the aborigines dwelling there. But after the death of Brutus the larger part of the island was called Loëgria from Locrinus, the first born of Brutus, and now England from the Angles and Saxons who inhabit it and who drove all the Britons into Wales, the third part of the island which once was called Cambria from Cambrus a son of Brutus. But the smaller part of the island verging northward, which anciently was Albania from Albancus, son of Brutus, was seized by the Scots, so named from their painted bodies, and from them is called Scotland. It is very friendly to the French and very hostile to the King of England. This part is separated from England by a narrow strait from the west, the Tweed river from the east and in the middle the Ordoluci mountains called the Cheviots.

The dress of the Scots is unusual in almost all respects, but they have almost the same language and same customs as the English. They are of quick intelligence, ferocious and prone to vengeance. They are brave in war, very enduring of hunger and lack of sleep, of pleasing stature, but very lacking in sophistication. Of envious nature they scorn other mortals and display their nobility to excess so that although in the greatest want they refer to the royal lineage of their clan and convince themselves with dialectical arguments. They rejoice in falsehood nor do they cultivate peace as the English. The use of coal for heating is so common that beggars seek it as alms from those who are departing. This island is in the form of a triangle and very similar to Sicily; it looks on the east to Germany, on the south to France; on the west to the island of Ireland and on the north to the thirty Orkneys. The length from Totnes in Cornwall⁵ to Caithness in Scotland is 800 miles. The width, that is, from St. Davids in Wales to Dover, 300 miles, and the distance around 3600. In book V of the Commentaries of Caesar it is 2000 miles, for the side toward France from Kent to the Lizard is 500, the west 700 and the third side 800 miles.

The land is more temperate than France and there is greater remission of cold and heat. It is abundant in fruits and trees and suitable for the grazing of cattle and sheep of which there is a great number, and especially of sheep since there are no wolves. Once there was no wine, but now there are vineyards in certain places. There are gold, silver, iron, lead, tin and abundant coal. Skins are exported and dogs trained for hunting.⁶ There are very large rivers with fish, which flow with alternate movement twice daily now to the sea, now flowing upstream. There are salt

⁵ An error, since Totnes is in Devon.

⁶ The English concern with dogs which is displayed so prominently by John Caius in his *De canibus britannicis* (London, 1570).

springs and hot springs and there are gems, pearls and much very good jet. The longest days are eighteen hours and in the summer the nights are light. There are many men who, as Plutarch says, live for a very long time.

The language of the English, drawn from many peoples, is very difficult to understand and to speak. In warfare they are intrepid, the best bowmen, very rich and much given to commerce and celebrated for their noble cloth because of the supply of good wool. In addition to other things, they cultivate music and have splendid banquets. Their eyes are blue, their faces somewhat ruddy and their stature tall. As St. Gregory said when by chance he saw English boys sold in Rome, alluding to the word for their native land, "they are called Angles because their countenances shine like those of the angels; they must be given the road to eternal salvation"; which was done, as Bede says, in the year of the Lord 156, with Lucius, King of the Britons, seeking it by a letter from Pope Eleutherius, under the emperors Antonius and Commodus.

In England there are two archiepiscopal sees, Canterbury and York, 19 episcopal, about 50 cities, 136 towns and 63 provinces. There are very few dukedoms and counties.

The other island, Hibernia, neighboring this one is called Ireland. It obeys the King of England. Placed to the west it is less than half the size of Britain. Such is its pasturage that there the cattle are in danger of satiety unless they are taken from the pastures in the summer. It does not have any harmful animal, neither spider nor frog, nor does it maintain any brought there from elsewhere. The land kills such as are brought and reduces them to dust. The sky is temperate and the fertility of the soil remarkable.

The people, however, are inhospitable, uncivilized and cruel. They devote themselves more to hunting and games than to cultivation.

Spain and its contrast to France

Spain is surpassed by France in abundance of wine, grain and meats but surpasses in the goodness and flavor of them. France is fruitful by reason of the amount of her rains; the Spanish employ much irrigation, conducting trenches or streams of water long distances from the great rivers. Unlike the French, the Spanish are not bothered by the cold, northern winds wherefore they produce more abundantly oil, honey, saffron, rice, madder, minium, cochineal, sugar, Spanish broom, rosemary, lavender, lemons, capers, dates, limes, apples and pomegranates as well as other aromatic fruits.

The temperament of the Spaniards is hotter and dryer and their color dark; of the French, more cold and moist, the flesh softer and the color lighter. French women bear more children than the Spanish. The French are endowed with larger limbs, the Spanish are tougher and have a closely knit body. The French fight with more ferocity than skill and they wage war with more force than plan. The Spanish are the opposite.

Spain has always been esteemed for the fleetness of its horses which are readily guided merely by pressure of the thigh by the light-armed horsemen who exercise with the lance and in all other military actions more frequently than the French; although the heavy-armed cavalry of the French is not to be scorned.

The French are more talkative, the Spanish more taciturn and accomplished in dissimulation. The French are vivacious, animated and prone to conviviality and shun completely hypocrisy and gravity which the dissembling Spaniards maintain. For the Spaniards in banquets are less sociable, more ceremonious, affecting a kind of seriousness which the French do not possess.

The French drink wine but the Spaniards, wine diluted

with much water. Among the French foreigners are received in their hospices with the greatest kindness; and no service being denied them, they are offered whatever food is available. Among the Spanish they are received harshly and without civility, so that wearied by the journey they are compelled to seek food for themselves from place to place. This occurs because the Spanish are not such frequent voyagers and are unwilling to spend so much money on the table; nor are they so ready to give service, so that a peasant, if he is disinclined, will not deign to give his service to a prince.

Spanish is a graver speech, French more suave. Among the Spanish the widespread Castilian people employ the most elegant speech; in France you will hardly distinguish what city speaks the true French since that is the speech of the nobility and the court more than it is peculiar to any particular place. Spanish is closer to Latin.

The soil of Spain is more extensive but not so populous; it is richer in gold and silver but not from the commerce of merchants, nor is so much income collected for the king in the former as in the latter. Almost no part of the soil of France is idle but of Spain there is much uncultivated and empty land. There is more fowling and hunting in France and many eat fowl even though it be very expensive.

From Spain into France the merchants carry cereals and silks of all kinds, woolens, saffron, sugar, rice, oil, alum, scarlet dye, gems and aromatic substances received from the Indies. From France into Spain, grain, linen cloth, thread, woad, which they call pastel, books and much other lesser merchandise such as swords, mirrors, needles, etc.

In Spain there is a huge number of princes, dukes, marquises, counts and barons. In France there are numerous nobles but fewer princes of great dignity, which increases

the wealth of the king who alone possesses all things. In Spain there are 20 dukes, the annual income of each of whom is from 50,000 to 60,000 ducats, 20 marquises receiving about the same, 60 counts whose annual income is from 10,000 to 20,000 ducats and some who have more than 50,000. The number of viscounts, barons, prefects of provinces and those who are called provincial governors, viceroys, governors, marshals, mayors, all princes, is unknown to me.

There are the Grand Masters of the knightly orders such as that of Santiago, Alcántara, Calatrava, Rhodes, San Juan, Montesa, knights so-called of Christ, and others with the name Davis. Of each of these the income is from 500 to 1,000 ducats or more.

As regards ecclesiastical dignitaries there are more in France, for it has 12 archbishops and 96 bishops; Spain, 9 archbishops and 46 bishops. The number of cardinals is the same in each country, usually eight. The number of archbishops is constant at 9. Their income is very great in Spain and that one of Toledo receives annually 200,000 ducats and a single archbishop, 80,000. I would mention the names and incomes of all the rest except that I might perhaps bore the reader.

Instead of the parlements of France, in Spain there are juridical conventions in Castille, Granada, Galicia and Navarre. The number of those skilled in law and court procedure is much greater in France. In Spain great authority is held by those called inquisitors of the faith, who have acted with great severity against the marranos, heretics and saracens. There is another remarkable institution of justice called the Hermandad. It is a sworn fraternity of citizens and at the sound of a bell from individual cities many thousands of men come forth to pursue any malefactor through the whole province, and when messengers have been sent ahead to the other cities it is almost

impossible to escape. He who is apprehended is tied alive to a stake and shot with arrows.

In the time of the Moors there were many kingdoms in Spain; recently there were five kingdoms in all, Castille, Aragon, Portugal, Granada and Navarre. Today one emperor, Charles, controls all with the exception of Portugal which has its own king.

The minds of the Spaniards are restless, constantly planning great designs; they are of happy wit but imperfect learning so that you will find a learned Spaniard anywhere rather than in Spain itself. They believe themselves learned when they are half-taught, and by pretence and a kind of verbosity they display a greater knowledge than they actually possess. They delight in sophistry and rejoice to speak better Spanish than Latin in their schools, although they have taken over many words from the Moors and have cultivated many of their barbarous customs and usages. Because of the defect of the language they rarely produce monuments of their ability and they always seek their books elsewhere.

The French would consider barbarous that custom of the Spanish women by which they pierce the lower portion of their ears with a gold or silver rod on which they frequently hang gems. They place about their waist a wooden girdle or some kind of instrument of torture so that with a broader appearance they may seem more dignified, nor do they leave their homes except with an accompanying troop of servants preceding and following them; but the French women [live] simply, so that scarcely a single attendant accompanies them on foot. Also the Spanish women wear shoes, sometimes a foot, sometimes a foot and a half high, so that they appear to move about almost on towers. As in the case of the ancient Roman women, so the Spanish women are to be praised for their abstinence from wine but they are to be criticized because

they make their faces hideous with eye-paste, minium and ceruse because their natural coloring is less than that of the French.

The Spanish are considered the most observant of all mortals in their religious rites, but they swear according to pagan custom by the throne of their king and his life, and they kiss hands in greeting.

For some years the Spanish have acquired a name from their bravery in war and their many victories gained over the enemy, as those who are able to endure much effort, thirst and hunger in battle, and very astute in stratagems; of slight body they easily flee and pursue the enemy. Of frugal life, like the Italians, they do not take so much food and drink as the French and Germans, unless they are invited; but then they fill themselves to the utmost with edibles because feasts are rare for them and they accept them with the greatest avidity.

They are famous for their navigations of the ocean to unknown regions throughout the whole world. To the south they first sailed around the end of Africa to Calicut and other eastern islands; this route is that of the Lusitanians or Portuguese. The Castillians proceeded westward to a multitude of islands rich in gold which they discovered and subjected to their rule, reaching also to the continent of the east Indies where they remain, daily extending civilization. Recently they gained some knowledge also of the regions which lie under the south pole.

France

The name of the Gauls once held great terror for the Romans, Greeks and Asiatics since Rome was captured and sacked by them, the Macedonians conquered, and that part of Asia which was called Galatia or Gallograecia subdued. The fecundity of the Gallic women was and is amazing so that Gaul always sent forth many emigrants;

nor today is the soil of France able to support them so that many thousands of men of humble rank emigrate to Spain and Germany every year.

Likewise the fecundity of its soil is no less remarkable, so that the Italians and Spaniards are often accustomed to seek the grain of France, whence the Mantuan: the land fertile in men and fruits.⁷

The Gauls were thus first called because of their milky white color, for *γάλα* signifies milk. Today they are called French from the Franks, a people of Germany by whom almost all Gaul was subdued.

If you desire to know the customs of these men: of fiery mind, emotional, athirst for new things, quick, animated and inclined to conviviality. Juvenal considered the Gauls litigious,⁸ and today they hold this name because they are moved to litigation over very small matters, which is not the case with the Germans and Spaniards unless compelled. Whence I dare to affirm that there are more advocates, procurators and notaries in France alone than in ten Germanies and Spains.

They consider their parlements of senatorial rank which in some cities are well established, as in Paris, Rouen, Toulouse, Bordeaux, Grenoble, etc. Each has four presidents and many counselors. These, like successors of the council of Druids, render decisions in important matters without any appeal and issue writs which are then considered as law.

France is filled not only with lawyers but with professors of all the other disciplines as well. Witness the University of Paris. Toulouse is the mother of those skilled in law and of many others. But the most famous of all is

⁷ Servetus is apparently referring to the *Georgics*, II : 173, *magna parens frugum, Saturnia tellus, magna virum* (land of Saturn, great mother of fruits, great mother of men).

⁸ VII : 148.

Paris where gather almost all Christians of Europe for the study of theology, philosophy and other liberal arts.

From the time of Charlemagne the French have recognized twelve men called the peers of France. Six are ecclesiastics, of whom three are dukes: the Archbishops of Rheims, Laon and Langres. Three counts are bishops: of Beauvais, Noyon and Châlons. Of the seculars three are dukes, of Burgundy, Normandy and Aquitaine; three are counts, of Flanders, Toulouse and Champagne. None of these six exists until the king has given the title to him.

The Emperor Charles possesses the county of Flanders as well as Burgundy, Holland and Brabant. The others which are contained in this plate [i.e., map] are possessed by the king himself except the bank of the Rhine. Also Lorraine has its own duke. Those of Calais obey the King of England. The territory of Switzerland is governed as a democracy. Two memorable things are related about the King of France. First that there is in the church at Rheims a vessel perennially filled with chrism sent from heaven for the coronation of the king, with which all the kings are anointed. Second, that the king himself by his touch cures those suffering from struma or scrofula. I myself have seen the king touch many attacked by this ailment but I have never seen any cured.⁹

Germany

If we believe Tacitus, Germany was once overgrown with forest, sterile by reason of its swamps, incapable of fruitful trees and all cultivation. But now all is so culti-

⁹ This forthright doubt of the cure is toned down in the second edition although the element of doubt remains. Another and contemporary Spaniard, the surgeon Dionisio Daza Chacon, also had his doubts about the efficacy of the royal touch since he remarks that he had seen sufferers who "became worse than before." However, he is diplomatic enough to add "I have seen many who were cured" (*Practica y teorica de cirugia* [Madrid, 1678], I : xci).

vated that the Hercyian forest is scarcely remembered.

Many contend that the Germans are indigenous and not a race migrated from elsewhere, but others attest that they are called Teutons from Tuisco, son of Noah; and that Alemannia is from Mannus his grandson; also that Germany is so called because the race lived in an equal condition like germane brothers.

From the beginning the territory was extensive and made more so through their own efforts, for according to the description of Ptolemy this race, shut in by the rivers Rhine, Danube and Vistula, extended its rule and language everywhere. Having crossed the Rhine, it seized the largest part of Belgic Gaul, that is Switzerland, Alsatia, Burgundy, Eifel, Brabant and Guelders; the inhabitants of these regions speak not French but German and are of the German empire. Beyond the Danube also the Germans gained control of Rhetia, Bavaria, Austria, upper Austria, the Alps and part of Illyria. In addition, beyond the Vistula the Teutonic Knights subjugated Prussia and some parts of Poland. Finally they gained control of the [Holy] Roman Empire, but they do not give much obedience to the emperor. The fortified cities have gained freedom for themselves while the rest has been seized by the ecclesiastics and other princes, so that the title of emperor is almost empty of meaning.

Seven princes of Germany elect the emperor: the King of Bohemia, the Count Palatine, who is also Duke of Bavaria, the Duke of Saxony, the Margrave of Brandenburg and the three Archbishops of Cologne, Trier and Mainz.

Germany is divided into upper and lower by the Mogunas or Menus river—commonly called Mein—which flows down from the Bohemian Mountains westward toward Bamberg, Würzburg and Frankfort, the emporium of all Germany. Of upper Germany are Switz-

erland, Alsatia, Swabia, Franconia, Bavaria, Austria, and Styria. Of lower, are Holland, Flanders, Brabant, Hesse, Westphalia, Saxony, Frisia, Pomerania, Prussia, Thuringia and the Mark of Meissen.

Formerly no wine was produced but today there is much cultivation of the vine especially near the Rhine, even though in lower Germany a drink is made from grain and apples. Germany abounds in silver so that the Italians, French and Spanish frequently seek this from the merchants of Germany; also lapis lazuli, sapphire, rock-crystal and amethyst, as well as very precious skins of wild beasts. As is commonly said, Hungary in particular produces cattle; Bavaria, pigs; Franconia, stumps, turnips and licorice; Swabia, bawds; Bohemia, heretics; and Bavaria, thieves; Switzerland, murderers and cowherds; Westphalia, liars; and finally, all Germany, and all the north, gluttons and drunkards.¹⁰

The dress of the Germans is very modest and more decent than ours, and rarely do they wear silk. They wear a great cap, wide sword with blunt end, a long gown, not the short cloak. The women wear leggings instead of leather boots and wear finely woven veils around their heads; the rest of their adornment is also almost all of finely woven linen.

In civil society the Germans do not laugh readily unless they have been influenced by wine, but then when first they have overthrown the tables, they smash their cups and finally fight with fists and swords.

They pass the winter in heated rooms because of the fierceness of the cold. The condition of the agricultural peasants is miserable since they live scattered in the rural areas in huts of wood and mud built little by little from the earth and covered with straw. Their bread is oatmeal

¹⁰ This severe characterization of the Germans is deleted from the second edition.

porridge or boiled beans, their drink water or whey.

There are prefects for each district who are called Sculteti and who maintain the peasants in irremissible servitude and abuse and oppress them. Hence in our time we have seen the conspiracy and revolt of the peasants against the nobles.¹¹ But they always fail miserably. The larger part of the farm land is not theirs but belongs to those to whom they pay annually a certain part of their crops and for whom they cultivate the fields, gather the crops and carry them to the granaries, cut wood, build houses and dig ditches. Nor does anyone dare refuse to obey these orders.

In the cities there is a more developed administration; the people choose magistrates who judge capital offenses and exercise all the laws of the entire empire, not according to the laws of the emperor but according to the dictates of reason and custom.

The men of Germany are of ruddy color, very large limbs, valorous in war, yet very unwilling to bear thirst, hunger, heat and the yoke of labor; by nature they are sudden and rash at the first charge. Of probity, veracity and not at all designing, rarely does one deceive another in business although the French and others do it frequently. For the Germans also tend to the worship of God, and once imbued with opinions they are not easily changed, nor are they able to be brought back from schism into concord but each one strongly defends his heresy.

Italy

Italy was once called Hesperia from Hesperus, the brother of Atlas. Or, as Macrobius says,¹² from the star Hesperus, because Italy faces to the west. It is a territory

¹¹ A reference to the great Peasants' War of 1524.

¹² *Saturnalia*, I, iii, 15.

rich in metals, everywhere alive, perennially salubrious, famous for its temperate skies, the fertility of its soil, the protection of its hills, the salts of its waters, the thickness of its woods, the notable variety of its forests, the remarkable quality of its fruits and vines and the abundance of its olives, the noble fleece of its sheep and the magnificent necks of its bulls.

Its lakes are notable and filled with fish. The rivers and springs are salubrious and the harbors many. Extending into the sea to aid mortals, and by its commerce extending into the society of all peoples, it has by some been called the mother and parent of all the earth, chosen by celestial providence to gather the scattered empires and to soften the customs of barbarous peoples, to bring into concord the dissonance of tongues through its literature and its Latin speech.

The color of the Italians and their stature vary in Cisalpine Gaul and beyond Venice; the color is commonly light, the culture and speech more sophisticated. On the other hand, throughout Tuscany, Latium, Campagna and the Abruzzi, the hair is dark, the stature shorter and lean, the speech and culture unsophisticated.

The customs, manner of life and laws are not the same for all. Some obey papal laws, some imperial and others municipal. All, however, live frugally, dress neatly with the hair cut short, in short Spanish capes and with the legs displayed. The Venetians, whose city holds great dominion on land and sea, dress in a fuller gown such as the Greeks, Turks, Russians and the other northerners wear. They so delight in the dress of their elders that very often grandsons wear the clothing which their remote ancestors wore. They are much given to deliberation, slow in speech, harsh of pronunciation, with a certain ridiculous magnificence, a compliance in speech, but scarcely truthful. They feign to pardon wrongs, but if given the oppor-

tunity none gains crueler revenge. Frequently they employ horrible and blasphemous oaths against God.

The Milanese, hated by the French, in turn hate them as much as the Spanish, and trust in no one. Their discourse is rude and their speech rapid, but that of the Piedmontese much ruder and annoying. They are of no value in war unless there are many of them together.

The discourse of the Genoese is ridiculous and cannot be compared in its learning with the others. However, their dress is elegant so that they are neither skirted nor gowned. They possess neither much purpose nor faith, are prone to rebel, and are inhospitable and ungrateful.

Among the Italians the language of the Tuscans is to be commended. They have always been very religious so that once they taught the Romans many ceremonies in the religion of the gods, and in general they are a more religiously observant people than warlike.

Proud Rome, despoiled of the empire, became the seat of the pope, and the purple cardinals assist him. Their number in Christendom is now 46. The Romans are zealots and punish adulterous women very severely.

The Pisans are the most factious of the Italians. There are on the one hand, as it is said, the Panchiati, the sect of Ghibellines, who defend the imperial cause; on the other those called Canchellierij, the Guelphs, who follow the cause of the king [i.e., pope].

The Neapolitans reject all advice, are rustic, loquacious, adulatory, fiercely vengeful of wrongs and especially grateful for favors. They seek for the woman they love fantastic images made ghostly in minium and ceruse, and they do not love them if they are not of fickle mind and accompanied by a troop of maid servants. They affect Spanish speech and, like the Spaniards, practise riding and throwing the lance and dexterously bending now to this side now to that. They dress with splendor, perfume

themselves, consume more sugar than bread, and eat heartily also of cabbages. The Neapolitans ridicule the Calabrians, the Calabrians the Apulians, the Romans, all these, and the Tuscans the Romans, whom others in turn ridicule. So that all the Italians ridicule, condemn and call barbarians the other mortals although they nevertheless are the prey now of the Spaniards, now of the French, now of the Germans.

The Western Ocean of the New Land

[Here Servetus has retained Pirckheimer's account with some minor changes and added to it the following account of the return of Columbus to Spain :]

And there a tower was erected 39 feet high, and some of the party having been left as guardians and possessors of the new world discovered by them, that same Columbus returned with the rest in two ships to Spain where he was received honorably by the rulers and at their order was saluted by all as viceroy, admiral and governor of the aforesaid new world; and thereafter he returned to the continent where he discovered many other islands which are now very happily ruled by the Spanish.

And those err to high heaven, as it is said, who contend that this continent should be called America, since Amerigo approached that land long after Columbus, not with Spaniards but with the Portuguese and for purposes of commerce and trade.

II

THE APOLOGY AGAINST FUCHS (1536)

WHEN Servetus first became interested in medicine is unknown. It is quite possible that in the course of his proof reading in Lyons his interest was aroused as a result of the large number of medical works which were published there, some of which he no doubt read for the press. Furthermore, medicine at this time was in considerable degree a philological problem. The Greek texts of Galen and Hippocrates and precise Latin translations of them were being published in increasing numbers, and renaissance medicine, which was in the course of freeing itself from medieval bondage, was rapidly becoming slave to the word of Galen. This would no doubt appeal to one so literal minded as Servetus. In large measure a medical education at that time could be and frequently was constituted of little beyond a proficiency in Latin and Greek. Actually, as will be noted, Servetus' *Apologia* is not much more than a philological exercise. Finally, Servetus speaks of himself as a student or disciple of Symphorien Champier, and it may be that he gained some interest more directly medical in character from Champier, a rather extravagant but forceful personality who had by this time acquired a wide reputation, not the least of it from controversy and self-advertising.¹

This first medical writing of Servetus, while related to the larger question of the newly revived Greek medicine in relation to the older Arabic school, was more immediately the result of a personal feud between Leonhard

¹ On Champier see F. Allut, *Étude biographique et bibliographique sur Symphorien Champier* (Lyon, 1859).

Fuchs² (1501–1566), the later distinguished physician and botanist of Tübingen, but then in Ansbach as personal physician to the Margrave George of Brandenburg, and Symphorien Champier (c. 1471–1537), the somewhat eccentric but celebrated physician of Lyons. In large part the two physicians held similar views in support of the new Greek school while their differences were the result of misunderstanding and wounded vanity.

Throughout the later Middle Ages and up till the opening years of the sixteenth century the ruling medical philosophy was that of the so-called Arabic school. As the eastern Mediterranean area had fallen under Moslem control, the writings of Hippocrates and more particularly those of Galen had been translated and incorporated into Arabic medicine where they achieved sufficient predominance to prevent—with few exceptions—any independent medical study and advancement. The definitive synthesis of this Arabic medicine was the *Canon* of Avicenna which toward the end of the Middle Ages was translated into Latin and came to occupy a position of equal importance in the Christian world. However, with the recovery of the Greek language and the Greek manuscripts of Galen and Hippocrates in western Europe, new and exact translations from Greek directly into Latin began to appear in the early sixteenth century. As a result, discrepancies were readily apparent between Avicenna and the Arabs and this new Galen, and thereupon the medical world became divided between the Arabists and the followers of the new, purified Greek medicine. It was in respect to this controversy that Fuchs in 1530 published his *Errata recentiorum medicorum*, a youthful work in which he frequently jumped to conclusions for which he had no solid foundations and displayed an indiscriminate fondness for the new Greek school. His thesis, illustrated in

² On Fuchs see Eberhard Stübler, *Leonhart Fuchs* (München, 1928).

sixty chapters, was the superiority of Galen and Hippocrates over the Arabs and especially Avicenna, their so-called prince, and each chapter calls attention to an error of the latter school. Two of the general sections of the book are concerned with the false identification of medicinal plants originally described by Dioscorides and, arising from this, the danger of accepting the Arabic therapeutics, notably the too frequent prescription and the extreme use of purgatives. Another matter to which Servetus alludes concerned the newly appeared disease of syphilis, about which Fuchs was in doubt as to whether it was truly new or whether it was related to the *lichen* of the Greeks. He was careful, however, not to express himself positively on this point and thus sowed one of the seeds of future misunderstanding. The *Errata* was somewhat naïve and not too carefully thought out so that it could be, and was, justly criticized on a number of grounds.

In the same year the Dutch physician Lorenz Fries published his *Defensio medicorum principis Avicennae ad Germaniae medicos* in which he advocated the strict study of the Arabic physicians as the only proper method of learning medicine,³ singling out for criticism Champier, originally of Arabist leanings but now moved over into the new Greek camp: "We have recently seen the attack of a physician of Lyons against the Arabic physicians, especially Avicenna . . . [in] a little book entitled *Sympophonia Galeni ad Hippocratem* [Lyons, 1528]."

Fuchs, apparently not a man to miss the opportunity for controversy, made a rejoinder to this defense of the Arabists in his next work, *Hippocratis epidemiorum liber sextus*, 1532, in which he refers to the arguments of Fries

³ Despite the ultra-conservative views of Fries, it is interesting to note that in his *Spiegel der Artzny* (1518), although the text is medieval, there is an illustration made from actual dissection, the full importance of which apparently was recognized more by the artist than by the author of the book.

as "puerile and of no significance." Thereafter, Champier entered the arena with his *Epistola responsiva in defensionem Avicennae Laurentii Frisii*, 1533, in which, while defending the new Greek school of medicine, he also criticized Fuchs, harking back to the *Errata* of 1530 and the question of the identity of syphilis as an old or a new disease. Actually, neither physician had expressed himself clearly on the matter and eventually both were to recognize syphilis as a new disease; but at the time Champier issued a direct retort to Fuchs, *Annotatio in Fuchsium*, 1533, which was translated to Fuchs by his old friend, the aged Arabist Sebastian Monteux (Montuus). This last physician also entered the fray against Fuchs with his *Annotatiunculae* of the same year in which he sought to demonstrate that twenty-three of Fuchs' sixty errata were without foundation.

Fuchs replied to these attacks in 1535 in his *Paradoxes* directed, as in the case of the *Errata*, in general against the Arabists but specifically against Champier who, instead of further rejoinder, brought the book to the attention of the Paris inquisitor on the basis of certain Lutheran tendencies in the work and succeeded in having it publicly burned as heretical. The actual literary reply was left to Servetus as self-confessed friend and disciple of Champier and apparently as willing a controversialist as any of the previous contestants. However, in his reply to Fuchs Servetus added a personal criticism unrelated to the theme of the argument, that is, his attack upon justification by faith since Fuchs was a supporter of the Lutheran movement. In his *De trinitatis erroribus*, 1531, and to a lesser degree in the *Dialogorum de trinitate libri duo*, 1532, Servetus had already criticized the doctrine and had succeeded in arousing considerable feeling and making himself *persona non grata* in the Lutheran lands. It is thus Servetus the theologian speaking, but to find a theological

doctrine appearing in his medical writings should not amaze us if we recall that his description of the pulmonary circulation is imbedded in one of his theological works. It is interesting, however, to note that in the present tract Servetus expresses a filial attitude toward the Catholic church.

If Fuchs ever saw Servetus' attack, he did not deign to reply to it. He was carrying on controversies with three physicians at the time and he may have decided that he could handle no more. The preface to the *Apologia* is dated Paris, November 12, 1536, and so gives both the first indication of and the approximate time of Servetus' return to Paris. Whether the little work was composed in Lyons or Paris is unknown. It was published in Lyons.

However, Fuchs appears to have been stung by assertions that he needlessly augmented his works by including both Greek text and its Latin translation, and in his defence of his practice there is the suggestion that he was aware of the attack by Servetus or, as he naturally calls him, Villanovanus. "The fact that I have always added the Latin [translation] to the Greek text was not that the *Paradoxes* might be increased in size, as Montuus considers somewhat maliciously, but that they might be equally intelligible to all: that is, for those who take greater pleasure in the Greek than in the Latin as well as for those to whom the former language is completely unknown. For I do not see what benefit might be gained from a reading of the *Paradoxes* by those who cannot follow the Greek [alone]. . . . I did not labor especially with the idea of pleasing Montuus and Villanovanus," *Apologia adversus aliquot palam insanas et convitiis plenas Sebastiani Montui dialexeis*, in Fuchs' *Libri IIII difficilium aliquot quaestionum* (Basel, 1540), p. 135.

IN LEONARDVM
FVCHSIVM APOLOGIA.
Autore Michaele Villanouano.



D: Williams's Library
London.



1536

An Apologia against Leonhard Fuchs
by
Michael Villanovanus

[Lyons]
1536

Michael Villanovanus salutes the most famous man, Master Charles a Stagno. S.R. Protonotary of the church and of the council of Lyons.⁴

If that kind of disputing which you consider, most noble Charles, in the judgment of any grave man ought to be condemned because it resembles calumny more than erudition, I know that you will say that Fuchs should be sent away that by his savagery and insolence he might subdue the wild Scythians and the fierce Thracians. Furthermore, since this Thessalian not only attacks with insults almost all skilled physicians, but also impiously reviles the Catholic church, I am unable to restrain myself from writing something in defence of the church, as a son for his mother, and in defence of Symphorien Champier to whom I, as a pupil, owe much. Fuchs was enraged at Champier because he commended the endeavor of Sebastian Montuus. But what crime is it, I ask, to praise the attempt of anyone, however he might differ from me, to pluck forth truth. That, truly, is the modesty of Champier; but Fuchs, a harsh man, bears this with displeasure. This age produces such strange evangelists that there is nothing they know less than Christian gentleness. But let us hear Fuchs who, discoursing on the church in the introductory epistle of his *Paradoxes*, speaks thus: For this reason also, that you may achieve this, that among you Christ may be proclaimed purely, do not at all yield or permit a place of assemblage to the Papists, men of the belly. Such is his attitude. In the course of the work he also introduces other things no less erroneous than impious,

⁴ The present translation was made from a facsimile of the copy of the original edition in the Dr. Williams's Library, London. There is a slight bit of information on Charles a Stagno, not particularly relevant in the present case, in Henri Tollin, "Michael Servet's Brevisima Apologia pro Symphoriano Campeggio in Leonardum Fuchsim," *Deutsches Archiv für die Geschichte der Medicin*, VII (1884), pp. 409-42.

and he impertinently cites the apostle Paul that he may be able to calumniate Montuus. But I shall not therefore take up the defence of Montuus since he himself will soon bring forth a work against Fuchs through which the impudent boasting of the man will be easily disclosed. He so ascribes a triumph to himself and contends that he has conquered that he is like a rash horseman, attempting with a great leap to mount upon a horse but tumbling headlong on the other side. For he does not consider it sufficient unless he discloses himself to be a heretic and attempts to lead others into heresy. Whence I believe I would be doing something worthwhile if, before considering the two places in Champier incorrectly censured by Fuchs, I were to write something on faith and works lest any weak person be seduced by the errors of Fuchs. It only remains, most humane Charles, that whatever may be our qualifications, you receive this from our unskilled hands with cheerful mien and defend strongly from the poisonous fangs of Fuchs our church and your adherents, Montuus and Champier. Farewell most worthy Maecenas.
Paris, November 12th.

1536

Concerning Faith and Works

The question of faith and works, and in my judgment not a difficult one, agitates almost the whole Christian world, with those on either side united on how to attain eternal life. For the Lutherans, whose arguments it will not be difficult to refute and whose errors, to uncover, do not wish to attribute anything to works, because they do not sufficiently understand the force of justification. It is enough for them that the Savior himself says to anyone believing in Christ: Your faith saves you, go in peace. This certainly is justification by faith alone without works, just as Abraham, Rom. 4. For the approach to the gospel

of Christ and to Christianity itself presupposes no requisite works for justification, but is approach to Christ through the portal of faith and not through circumcision. And to be justified is nothing other than from impious to become acceptable to God and to be enrolled in the militia of Christ. This, as Paul teaches forcefully against the Jews, occurs through faith and not through any works of the law. Therefore, will the works which accompany this faith be useless in Christian justification? Not at all. Why does Christ promise a reward for a fast day? Moreover, he asserts that the father is going to render a reward in public for alms given in secret, Matth. 6. And for caring for our enemies we shall have a reward larger than that for caring for our friends, Matth. 5, and Luke 6. Also the more care, the greater will be the favor, Luke 7. And for one calling the poor to table the reward will be paid for that work in the resurrection of the just, Luke 14. Nay even, for giving to the thirsty and the cold Christ himself promised a sure reward, Matth. 10. The Lutherans believe that there will be equal glory for all the justified and equal punishment for the reprobates, because they affirm that men are not damned for the sake of crimes but solely for the lack of faith; by which it would happen that Judas on account of a greater sin would not be punished more severely than any other unbeliever. Behold in what way. Now what of these things which I recall, as in the sacred scriptures where it is expressly stated what is going to be, and that one may precede another into the kingdom of heaven? And it will be more endurable to certain ones than to others on the day of judgment, and certain ones will be two-fold sons of Gehenna, and will receive doubly severer judgment and greater damnation on account of evil deeds, Matth. 23. Mark 12. Some also will be afflicted with many stripes, others with few, according to the manner of the transgression, Luke 20. And just as star differs from

star in glory, so also with the resurrection of the dead, I Cor. 15. And this not alone by reason of faith, but because their works attend them, and because it will be judged concerning each one according to his works, Apoc. 14 and 20, likewise Apoc. 18, twice two-fold according to his works, and as much as he gloried in voluptuousness, so much give him of torment. Is this justice which comes from the North, that to the more delinquent Judas greater punishment will not be given? Is it not so, that of each idle word account must be rendered on the day of judgment? Matth. 12. Whither therefore extends such close scrutiny of words and deeds to the last farthing, if works add nothing to the increase of glory or penalty. Indeed, that Supreme Judge in the last judgment, according to the works or deeds of each one, will recompense him with penalties or rewards, for thus says Matth. 16. The son of man will come in the glory of his father with his angels and then he will render to each one according to his deeds. Besides recitation of deeds he will also pass sentence, saying, I was hungry and you gave or you did not give me to eat, etc., Matth. 25. It is to no purpose that the Lutherans say that their faith is never idle. For this, as it is false, if anyone considers, so it does not set up account of reward nor of future repayment for good works on the day of judgment, which the Lutherans, if they had sane judgment, would readily admit since, indeed, a Christian justified by faith is yet justified through works on the testimony of Jacob. And Paul testifies, II Cor. 9, that through works are increased the increments of the fruits of our righteousness, and through consequent works election, calling and our justification are more firmly accomplished, II Peter 1. If, indeed, Fuchs were a philosopher—for it is clear that he is not a theologian—he might at least disprove this heresy, in the manner in which Aristotle acknowledges that felicity consists in service in accordance

with virtue and cannot consist in the condition of virtue if that virtue is allowed to lie dormant during a long period, or is void of service. This is quite capable of happening in one holding the Lutheran faith, howevermuch actions are induced from the condition of virtue and works from faith, for it is necessary to employ new effort beyond all condition of virtue and impulsion of faith for the performance of service. For principally the active cause is the substantial form or the desire itself in man, and faith and appearance are instruments. And so it is fitting that some consideration be given these services for the felicity of which the scriptures make so much. For on the testimony of Jacob, if the works themselves were not forthcoming, faith might cease; just as, according to philosophers, without actions the condition of virtue lessens.

*Concerning scammony about which Fuchs
is notably mistaken*

Now let us hasten on to the medical matter and examine whether or not Fuchs spoke truly. First, says Fuchs, regarding scammony Paul of Aegineta, book VII, teaches that for those without fever or weakness of the stomach, two-thirds of a drachm with ginger ought to be given. And Oribasius in his compendium [book] III, asserts that a whole drachm can be given. I would not say that I believe that such a quantity of scammony could be administered today, says [Fuchs], were it not that I have shown that the scammony which we employ today is not genuine. For if it were genuine, that quantity which was prescribed by the ancients could not be given safely. Then he attacks Champier on the grounds that he said incorrectly that the scammony of the Greeks and that of the Arabs were different. And thus Fuchs neatly finds a refuge where, tacitly dissolving the objection, he says that our scammony is not genuine. But what will he say concern-

ing that of the Arabs, if he says that it is not genuine but mixed with other things? already he has concluded with us that the scammony of the Greeks and of the Arabs is not the same. Who truly is so stubborn that he asserts that none of the Arabs or of the Christians knew genuine scammony? Because if the Arabs knew true scammony, as Fuchs himself grants, what will he say to Mesue who affirms that from five to twelve grains only can be administered, and that if anyone takes more it will kill him, when so many Greeks employ sixteen grains and more; and of Dioscorides who says that up to two drachms from its roots can be given? Does not this variance in a simple drug argue a difference? Furthermore, Fuchs denies that Champier is correct, who wrote that the scammony of the Arabs is a type of milk-weed; but Fuchs says that it is adulterated from the milk of the spurge, and that Mesue spoke of this with the attempt to deceive. It is strange that Fuchs is so daring in so open a matter. But let him read Mesue again, who in the beginning of the chapter concerning scammony speaks thus: Moreover, scammony is made from the juice of a certain convolvulus type. Because, truly, this convolvulus type, aside from all the milk of the spurge, is of the type of milk-weed. Mesue writes the same in the preceding chapter regarding the convolvulus type in this manner: And it is the fifth type of it, the root of which is like *fesirersim*, but thicker; indeed, it has the thickness of a rather large cupping-glass, its stalk rises about two cubits above its root, and its leaves are close together, small like the feathers of an arrow, and float off with little effort. It possesses milk and is called the master of the milk-foods, and from this scammony is made. Hear, Fuchs, what has milk and of the milk-foods holds the leadership among the convolvulus type, that from which the scammony of the Arabs is made. On the other hand, Dioscorides does not say that scammony has milk, but that it is adulterated

by milk. From the indications Fuchs is arguing that they must be the same. But Dioscorides says its leaves are ivy-green and triangular, Mesue, however, like the feathers of an arrow. And who does not know that the leaves of ivy are wide, flat and not angular, nor compare to the shape of that which Mesue describes, since he asserts in the place already mentioned that its leaves are close together and small? There are also many other things which, when the descriptions have been compared on all sides, do not seem to agree. Whence it may be gathered that there are different kinds of scammony just as there are different kinds of apples and pears which, nevertheless, have a similarity in some respects. Inasmuch as the Arabs assert that from five to twelve grains only of scammony can be administered, and as all the physicians who practise today observe this rule, it must be that it is different from the scammony of the Greeks of which they wrote that two or three drachms could safely be given at one time. Avicenna is a very trustworthy witness for this thing and speaks thus about scammony: Truly it varies in different regions so that in certain books of physicians I saw its dosage of very great weight. Behold how the scammony of those Greek physicians varies from the scammony of the Arabs, not just because of its mixture with the milk of the spurge, but on account of diversity of regions. In addition to these, another argument of Fuchs may be completely exploded, for from the proximity of those places he argues that it is the same scammony because Dioscorides and Pliny speak of scammony that was exported from Colophon, Mysia and Prine, and Mesue, of that from Antioch, but Fuchs does not prove that this is Antioch on the Meander. For there are two Antiochs, that near the Taurus mountains of Armenia and Corascenium, which Mesue mentions, and also that of Arabia which lies farther away from the Greeks. Whence this argument is very feeble

since Avicenna states that it is gathered in different regions and therefore varies; furthermore, because this difference can be found in such a variety of things in the same province, as all physicians acknowledge in the many other herbs which we obtain in our gardens.

*The Gallic Disease not considered by Champier
to be Lichen*

From the inscription of the title alone Fuchs assumes a dubious conjecture against Champier so that he may have occasion for calumny. Nor does he consider those things which are to be read in the context but seizes upon only the superficial part. In the text of the *Aggregator* of Champier, book XX, chapter 12, there is the following title: Concerning lichen or mentagra or pudendagra which our people call the Neapolitan disease and the Italians, the Gallic. Fuchs affirms that by these words nothing is more certain than that Champier considers the Gallic disease to be lichen. I judge that only the title of this chapter has been read by Fuchs. And it is strange that in reading the books of Champier, Fuchs has been so negligent in this instance since elsewhere he has been accustomed to transcribe from Champier's books into his own no few sentences and the title itself of his *Paradoxes*, and, moreover, the whole section on lapis lazuli. Truly the matter is absurd that, the whole of Fuchs abounding in thefts, he should accuse Champier of theft, since of himself he is unable to produce a proper work and fills pages with the Greek text of Galen and of others so that his *Paradoxes* may grow forth into a large volume. But in this matter, to use the words of Plato, it is the marrow, not the bark, that nourishes. Champier, in saying that the Gallic disease is called lichen by us, merely followed the name given to this disease in the titles of others, but in the marrow of the chapter he says that if at some time it

were that disease, because of the accident of its greater similarity to lichen it might rather be called lichen than some other ancient disease. This, indeed, is conditional; if in some degree it had been that disease, although he teaches clearly that he does not assert that such is the case. Therefore Champier does not affirm that the Gallic disease, which he has asserted constantly and on all sides is new and [the result of] the anger of God, is lichen. And so since in this disease Fuchs and Champier have the same opinion, for the former acknowledges it to be a new disease, and the latter, new and, with the theologians, the wrath of God, there was therefore no reason for Fuchs to hunt out so avidly these trivial occasions for calumny. Indeed, I might praise Fuchs if he would employ himself in this most worthy type of disputation without, however, slander and with equal consideration of those things remarked against him by others, just as he judges that his remarks against others ought to be given consideration. For neither Montuus nor Champier nor others are of a mind that they should hold anything dearer than the truth. If the Arabs err anywhere, neither strives to defend them beyond reason but rather they hold the studies of Leonicenus, Manardus, Fuchs and others as very dear, as truth itself; although they want an opportunity for disputation to be granted to them so that the truth itself may shine forth more clearly.

I had decided to put the final touch, as the saying goes, to this little work, but I was opposed by Gulielmus Guidobaldus of Beauvais, a student of medicine. And so lest he seem plainly ignorant of Greek letters he presented himself, of course modestly, as a *philiatron* in his apology against Antonius Galfredus Condriceus, outstanding professor of the art of medicine whom he calls disparager of the Tuscan Academy; indeed, he might more discreetly and truly have said reprobator, since he said nothing against

that Florentine Academy which could not be found on the authority of celebrated physicians and in an indisputable array of reasons. But lest by a long discourse I delay the reader any further, let us descend for a little while into the arena, not that we may seem to defend the cause of Antonius Galfredus, who on his own behalf is able to shatter the weak attack of Gulielmus Guidobaldus as if it were a reflection from glass, much less to sustain it easily; but that we may warn that fellow from Beauvais that no one ought to be pursued by a rabid monster so savagely, not to say atrociously, even if, as is said, the whole course, known to all the world, seems to wander. What if our Galfredus with a certain native frankness were to refute the conclusions of the Tuscans who so exalt not only insolence—for that is a common fault—but as well rashness, that they completely condemn and disapprove syrups, the most salubrious supports of our art, while they support the vain impostures of men in their midst. To these things they add the powders suitable for the heart which they endeavor to wrest utterly from the family of medicaments. Moreover, they contend that tenuous humors, of which sort are the bilious, ought in the beginning [of sickness] to be purged by no usual preparation or digestive; and that those desiring evacuation and who, on account of a density which needs to be reduced, urge that it must be removed and expelled by driving out, are contumacious. Moreover, hellebore, which Hippocrates and other ancient and notable physicians so greatly avoided, they employ with almost no discrimination. Except that a certain modesty restrains me, I might strive against them, and especially that fellow from Beauvais, so sharply and by demonstrable and scientific arguments, that they would be an example to the rest of the calumniators and schools of disparagers of our age not to dispute by contumely and insult. But it is quite apparent to me that they may be

disregarded. That fellow of Beauvais, unless you believe him a crow rather than a student of medicine, does not fear to name the learned and worthy Antonius Galfredus as a croaker. But let him beware lest he be painted in his true colors by Condriceus. I say nothing of Champier, a man very celebrated in deeds and words, a man acknowledgedly able to do more than ten like Guidobaldus, who I know for certain was going to write against that fellow of Beauvais since he has no hesitancy about injuring him, except that the auditors of Champier, who are not few nor by obvious indications, as is said, are they unlearned, intervened against this type of disputation, considering Guidobaldus, with whom the illustrious knight and physician would have to contend as unworthy and impious. I do not doubt that Antonius Galfredus, already attacked in open battle, is going to strike back so bitterly that he can easily return home victorious and loaded with Tuscan trophies.

The end

III

THE SYRUPS (1537)

As the *Apologia* against Fuchs indicates, Servetus was in Paris by November 1536. For somewhat more than a year he appears to have engaged in private studies, presumably geography, mathematics and astronomy, and also medicine, although there is no record which indicates that during this time he undertook any formal medical studies at the University of Paris. Nevertheless his little book, *On Syrups*, published in 1537, does contain references to two of the most distinguished members of the Paris medical faculty, Guinther of Andernach, whose lectures Servetus may have attended as a simple auditor, and Jacobus Sylvius of whom Servetus' remark suggests personal acquaintance. Guinther of Andernach in his *Institutiones anatomicae* of 1539 mentions Servetus in conjunction with Andreas Vesalius, the later celebrated anatomist, in the following words: "I have had the assistance [in dissection] first, of Andreas Vesalius. . . . My second assistant was Michael Villanovanus. . . ." On the strength of this remark it has frequently been asserted that Vesalius and Servetus were fellow students in Paris although this is certainly not supported by the chronology of their studies there. Actually Vesalius had left Paris and returned to Louvain before November 1536, the date of the preface to Servetus' *Apologia* against Fuchs. It seems much more likely that Guinther of Andernach's remark ought to be considered as a reference to time, that is, first Vesalius was his assistant and then at a later date, 1538, Servetus.

But even though Servetus had not yet formally enrolled

in the medical school of the university, the publication of the *Syrups* in 1537 indicates a growing interest in the subject of medicine. The *Syrups* is at once an expansion and a revision of part of the *Apologia*. In general terms it is written in support of the new Greek school of medicine and thus against the Arabists, but it is much more strongly anti-Arabist than the earlier work in which Servetus gave a certain amount of sympathetic credence to Avicenna and Mesue. Furthermore, there is a suggestion that if he had not broken with Champier, at least Servetus from the distance of Paris was able to consider him more dispassionately and objectively. Champier is no longer the idol and oracle. Furthermore, it is difficult to reconcile Servetus' denials in the opening paragraph of his *Syrups* with his closing remarks on syrups in his *Apologia*; from the point of view of the present it is regrettable that he did not frankly announce that he had modified his opinions rather than seek as he did to disclaim them completely.

The *Syrups* is based mainly on the authority of Aristotle, Hippocrates and Galen—predominantly on the last of these whom Servetus calls the “traditional authority”—and it represents once again the literal cast of Servetus’ mind. He is a full-blown Galenist who supports his arguments entirely by the word of Galen without any reference to his own medical experience since, of course, he had had none. The work is therefore a literary and philological exercise constructed, we may presume, entirely within the confines of his library. Yet so powerful was the authority of Galen at this time that even the seasoned practitioner was unwilling to oppose any conflicting experience to the word of the all-powerful Greek. Thus one possessed of adequate knowledge of Galen’s writings and equipped with skill in presentation and argumentation might produce an authoritative work. Such was the success

of the *Syrups*, which went through five editions¹ and which may be described as sound and logical within the framework of Galenical physiology.

The *Syrups* is an attack upon the teaching of the Arabic school with Avicenna and Manardus—commended in the *Apologia*—singled out as the major opponents. In particular Servetus is concerned with what he considers to be the proper use of syrups as an aid to concoction. According to the Galenical physiology, ingested food was first taken into the stomach where it received a first concoction or cooking and whence, after the separation of the unusable portion the remainder was passed on to the veins where it was carried in the blood. This latter portion was then concocted or cooked a second time by the body's innate heat, and it was by this second concoction, or coction, that the body was nourished, since it represented assimilation of the nourishment in the blood to one or another part of the body. This was the work of the nature, or physiological principle of assimilation, of the part. What could not be assimilated by the particular part was passed on for expulsion so far as that part was concerned, although another part of the body might in turn be able to assimilate some portion of this nourishment and in turn pass on the remainder.

The desired result was the correct balance of the four humors, or juices, in the blood, although by reason of improper diet, climate, activities and so forth there might occur an imbalance of one of the humors with resultant disease. Furthermore, with such disease the concoction or assimilation became defective. Thereupon the proper procedure was the correction of this imbalance with all its results as well as the defective physiological action of the parts, since unassimilated food in the blood represented

¹ In addition to the edition presently translated there are those of Venice, 1545, Lyons, 1546, 1547, 1548.

an undesirable rawness or crudity which must either in some manner be assimilated or be in danger of putrefying. This putrefaction, among other things the source of certain fevers, must be halted through the assimilation of what was still good in the nourishment and the expulsion of the putrefied remainder. Such therapy might require heating, cooling, humectifying or drying of the body's parts, the suspension of the condition of putrefaction, better assimilation and the segregation and expulsion of a redundant humor. Eventually Servetus is concerned with the employment of syrups as assistance in the rectification of various defects and ailments of the body and its parts.

Syruporum vni-
VERSA RATIO, AD GA-
leni censuram diligenter
expolita.

Cui, post integrā de concoctione disceptationem,
præscripta est uera purgandi methodus, cum ex-
positione aphorismi: Concocta medicari.

Michaële Villanouano authore.

Πρὸς τὸν φιλίατρον.
Εύροε ποιήσωμεν τάτε σώματα, τάτε πεπάνωμεν
Ωμὰ χυμῶμεν, τάυτης δόγματα ἴσθι βίελα.

P A R I S I S
Ex officina Simonis Colinæi.
I S 3 7

A Complete Account of Syrups Carefully Refined
According to the Judgment of Galen
To which after a full discourse on concoction
has been added the true method of purgation, as
well as an exposition on the aphorism: Medicate
that which has been concocted

By Michael Villanovanus

To the Philiatron

You who are going to concoct the crude humors
and restore health to the human body. Observe
the teachings of this book

Paris

From the shop of Simon Colines

1537

*To the Reader*²

Except for my desire to assist medicine and to maintain
a just defence of Galenical dogmata I had not intended as
yet, studious gentlemen, to take upon my weak shoulders
this heavy and, to many, frightening duty. But first of all,
love of truth compelled me even though unwilling. More-
over, the young candidate of medicine will be assisted if
he does not scorn the therapeutic part which usually con-
sists of prepared potions and purgative drugs; but only
through this single little book may he learn it vindicated
and restored from all injury for him. In this little book I
explain the maturation of diseases, the action of the con-
cocting power, the true function of syrups and how they
ought to be employed, a novelty, as it were, resurrected
out of an old dogma. Moreover, I think I have therein so
reconciled Galen to myself that I have no doubt that if an
unbiased judge were to consider us the judgment would
be in our favor; and if any one desirous of truth were to

² The present translation was made from the copy of the first edition of 1537 in the Lane Medical Library. There is a translation into Spanish made from the edition of Lyons, 1546, *Razón universal de los jarabes*, tr. by J. Goyanes and Jaime Torrubiano (Madrid, 1943).

weigh these things carefully he would never regret this reading. Incidentally, the reader ought to be warned of this fact: I am not that one whom Champier, in a certain misleading apology against Fuchs, depicted as a zealous follower of the Arabs and a defender of Champier's digestive syrups, since I, on the contrary, believe that the Arabs along with Champier should be disregarded and that the syrups are neither worthless nor should they be accepted blindly. Moreover, I am impudently accused of saying that in the beginning [of an illness] the tenuous juices ought not to be withdrawn, although this is not true nor was it ever considered so by me. But putting aside this matter, I call upon Galen by whose judgment, as the traditional authority, I have sought to direct this whole treatise on syrups. Whether what I have sought I have in any part attained will be yours, candid reader, to judge.

A little preface to the use of syrups

Compelled by wonder of the thing itself, we are forced to profess that the birth and rebirth of Galen were granted as a kind of divine gift for the assistance of various mortal needs. He was born in ancient times so that he, with his Hippocrates, might uplift and recall into the light medicine which had been hidden by a profound fog, and that he might destroy utterly the Thessalians, the Erasistratians and other sorts of absurd schools by which the divine art had been defiled and mutilated. In our happy age, he once shamefully misunderstood is reborn and re-establishes himself to shine in his former lustre; so that like one returning home he has delivered the citadel which had been held by the forces of the Arabs, and he has cleansed those things which had been bespattered by the sordid corruptions of the barbarians. Since all of these things have been demonstrated clearly by recent events, there is no reason for me to concern myself here with their causes or to add

my opinion to those already expressed. However, I shall endeavor to resolve another long-standing and unsettled dispute which concerns syrups or purgative preparations.

A great many disagree on the question of digestive syrups, as they are called, and for the following reason. They consider them as doing nothing other than to digest or to concoct, and contend that bilious humors are not to be evacuated without awaiting coction. The much larger forces of the Arabs advance into an opposing battle line, advocate Galen and Hippocrates in their defence and oppose the mother, experience, to the children. From what I am able to judge in this controversial question, neither side understands the matter thoroughly. I do not consider myself so great that almost like a judge I may preside over the controversy, or by condemning each side render myself unfriendly to all, but I shall not deny to anyone these things which I have freely received, nor shall I through fear hold back what may be of assistance to mortals. I shall give to the public what I believe to be very true. Syrups, or sweet, prepared potions, not only because of their power of concocting, but because of several other uses, ought to be defended as very useful.

The question of the concoction of bile which must be awaited in purgations I shall decide far otherwise, and I shall not await not only a concoction of yellow bile, about which there is dispute, but in addition I shall affirm that it cannot in any way be concocted any more than black bile or pituita, although a distinction is employed in regard to pituita. Therefore as I shall bring all things into the open, I must say first what a concoction is and that it is one thing only and not multiple; second, what things ought to be concocted; third, whether the entire concoction occurs through thickening; fourth, I shall explain the aphorism of Hippocrates which pertains to this matter and where there is much about purges; fifth, I shall con-

sider particularly the use of syrups. Finally, I shall give some discussion to what ought to be done after purgations.

What a concoction is and that it is a single thing only and not multiple. First discourse

I am about to demonstrate that the goal of the nature and the manner of concocting are the same in the well as in the sick, and that the opinion of the Arabs and of recent writers, who believe that any secreted humor must be concocted during sicknesses in order that it may more easily be expelled, must be condemned. For the leader Avicenna in the first *Fen* of the first book, sixth doctrine, chapter 3, concerning the natural faculties, narrates the various functions of the concocting faculty—which he calls digestive—saying that it concocts, matures, reduces, cuts up and thickens not only aliments but also certain kinds of humors. Hence he believes that in individual sicknesses yellow bile, black bile and other secretions of this sort are concocted or digested by this faculty, aided as well by syrups. One can't dispute with the Arab [Avicenna] in respect to these terms, although as an interpreter he ought to be criticized because he interprets the digestive faculty for the concocting. Indeed, Avicenna errs most shamefully in this matter when he presumes that the operations of this concocting faculty are of this sort. For this faculty never acts on a fully putrefied bile or any other similar excrement by concoction, digestion or any sort of elaboration. Not only did the Arabs follow the error of their leader, but those who profess Galen as their leader, for Manardus³ in the first epistle of book XIII, says that

³ Giovanni Manardi, 1462–1536, of Ferrara actually was as strongly if not as literally a Galenist as Servetus. His views to which Servetus calls attention and which he erroneously links with the Arabists are expressed in his *Epistolae medicinales*, which went through a number of editions. It is quite likely that Servetus knew that of Lyons, 1536, with a preface by Rabelais.

those secreted humors are concocted during sicknesses and through the concoction are assimilated in some way to the nature so that they may better be expelled. He supposes three sorts of concoctions, as if two would not be more than enough. In accordance with Aristotle and Galen, I do not deny that in the generation of pus there is a certain sort of concoction which is the maturation of raw and defective blood. However, I shall affirm in this discourse that there is only one universal method of concoction, and by what follows I am going to disprove the concoction of those secreted humors.

There is only one natural concocting faculty and its action is one and the same on aliments and on corrupt humors. Such action is always produced from the solid animal parts attempting assimilation to themselves, as Galen teaches us in *De placitis Hippocratis et Platonis*, VI, and Aristotle not otherwise in *De generatione et corruptione*, I, 7. But I shall give the definition of concoction offered by the Philosopher in *Meteorologica*, IV, 2, where he says that "concoction, therefore, is perfection by a special and natural heat from passive opposites." This is the general definition under which Aristotle comprehends all concoction of sicknesses, of pus, and of fluxions, which he expresses by the following words: "This coction, I say, is defined in one single manner; it is not made by cold syrups but by a special and innate heat. Therefore there will be only one specific concoction because there is only one efficient cause, heat; only one end, assimilation; also only one material is permitted from an opposite, not a fully developed humor but that which contains in itself something of aliment which by reason of similarity of substance is sought after by the solid parts, whether that matter be only aliment or whether through some alteration it has become defective, for both are concocted in the same manner although more excrement may be collected

in the one than in the other. In addition, each coction is aided somewhat by the same moderate heat, and is indicated by the same signs of urine and of other excrements." In the following discourse we shall collect five very positive demonstrations supporting these things.

Aristotle, however, makes a distinction between the concoction of aliment and of pus. We shall say that such concoction, or the maturation of sicknesses, is analogous to the generation of pus. Truly, if anyone has learned from Galen the generation of pus and the maturation of sickness he will say that there is no difference between the concoction of them and of aliment except *per accidens*, since there is in each the same efficient cause, formal, material and final; the same assisting precautions and the same symptoms. But since the nature has one end in concoction, that is, assimilation, and the preternatural cause another, corruption, it may happen almost *per accidens* that the nature does not achieve completion [of the concoction].

Galen teaches all these things as they concern pus most aptly at the end of the first book *De praedictionibus*. Because, he says, the nature when by reason of putrefaction it is prevented from attaining the perfect assimilation which it attempts, as, for example, in the case of food, yet attains it to some degree so that, although the substance cannot be assimilated, a similarity of color takes place. Hence it is that pus and sediment of urine receive a whitish color from the concocting solid parts, as Galen teaches. For the sediment of urine gains resemblance to pus and the putrefaction of fever to the putrefaction of tumors, *De differentiis febrium*, I, 7, 8.

Sputum by analogy compares to these things, *De crisiibus*, I, 18, 4; and Hippocrates says, *On regimen in acute diseases*, that sputum is concocted since it is similar to pus. For the nature by the concoction of sputum attempts

a true assimilation and often achieves it in some part; and if the sputum impeded by reason of fetidity—the cause of the putrefaction—does not attain a similarity of substance, at least it attains a similarity of whitish color as in the case of pus and the sediment of urine. Therefore those respects in which it attains a similarity to the nature may be called concoction; but not by reason of the generation of pus will the method of concocting be analogous or different, any more than between two things concocting aliment of which one collects more excrement and less nourishment than the other. For all these things happen through various reasons of the matter and force of the nature.

But let us give the very definition of Galen to prove the true concoction of sickness which he defines for us in *De morbis popularibus*, I. I shall write the Greek words of this because our interpretation translated badly. . . . That is, “maturation of sickness is a concoction of those things which are preternatural. Moreover, this concoction is a reduction of that which is concocted into the substance of the concocting agent.” He teaches quite plainly that the concoction which occurs in sicknesses, with the nature assimilating and reducing into its substance that which is concocted, is thoroughly accomplished.

Not dissimilarly he says, *De compositione medicamentorum secundum locos*, VIII, that concoction is a transition to the assimilation of the alimentary particles. Those things which he calls “preternatural” are not to be understood as those fully developed or putrid humors, for they cannot be reduced into the substance of the concocting agent. But the preternatural material of concoction which is matured in sicknesses and in some other part would be pure aliment although, as he explains, in some way vitiated; just as in the generation of pus the material of the concoction is not a fully developed humor but blood

which has attained a semi-bad quality, not entirely good, not truly bad, *Aphorismi*, II, 47, and *De simplicium medicamentorum facultatibus*, V, 5. And just as pus is never generated from a fully developed humor, so the maturation of sickness does not proceed from it. But let us return to the books *De epidemiis* where Galen teaches clearly that that concoction which is made in sicknesses does not differ from the concoction of aliment except in greater or less degree, as in two healthy persons of whom one concocts [i.e., digests] better than the other. For after the aforesaid definition, he compares the concoction of the well and of the sick. "Therefore," he says, "when a body is well and when there is relationship of the nature between that which is concocted and that which concocts, there occurs a change and alteration of the whole material to be concocted, or of the larger part of it, and a very small part remains in a semi-coction. But when they are affected preternaturally, which occurs when they are foreign to the nature of that which is changing and altering, that which is assimilated is little, and there is much excrement semi-concocted. Now just as in healthy bodies excrement indicates concoction, so it will indicate not otherwise in affected bodies." Observe his exposition which he calls "against nature [preternatural]."

Observe also that in all concoction or maturation, even of foreign material, something is always assimilated, little or much according to the varying disposition of material and forces. This, therefore, will be the single and constant method of concoction which may be proved from the order of the nature which Galen gives, *Aphorismi*, I, 22, IV, 22, and in the first book, *De dignotione hominum purgandorum*. First, the nature concocts; second, it segregates; third, it expels. A coction leading to perfection precedes so that what is able to be assimilated is gathered as natural aliment. Then, what is not of this sort is segre-

gated as excrement and finally expelled, because if it remained it would be harmful and it does not nourish the nature. Since this order is preserved in the concoction of sicknesses as well as of aliment, it follows that the manner of concoction of both does not vary in any way but is constant; however, fully developed humors are never concocted in this way. But you will understand all these things more clearly from the following words.

If from a weak concoction of aliment any excrement remains in semi-coction, provided its strength is increased or because of lack of other food, its concoction is able to be completed if the nature requires it as nourishment. The stomach, in that manner in which when once satiated it drives out the chyle as excrement, will again attract and will concoct if compelled by hunger. But in all this there is never a departure from the true analogy of concocting.

You may add another demonstration of the same theme if you recall that which Galen often teaches in *De facultatibus naturalibus*, III, *De placitis Hippocratis et Platonis*, VI, *De usu partium*, IV, *Aphorismi*, V, 39, and elsewhere; that is, the stomach, the liver and other parts of the body concoct for themselves, but they do not have the providence of the others. So that when in sicknesses a coction is made by the solid parts upon which an affected humor presses heavily, they, serving themselves and not in the service of the others, endeavor to assimilate whatever can be recovered from that harmful and unripe humor. Whence Galen writes at the end of the first book, *De praedictionibus*, that it is the duty of each one of the animal parts, according to its own nature, to reduce the nearest humor. He teaches in the places already mentioned in *De usu partium* and *De placitis Hippocratis et Platonis*, that this is the object and end of all the altering parts. Moreover, he teaches in the same place in *De epidemiis*, I, and in *Aphorismi*, II, 7, that concoction in diseases, as in

aliment, is made by the solid animal parts. Galen also teaches in many places that all other actions are performed by the solid and similar parts.

But let us hear Hippocrates who in *Regimen in acute diseases*, IV, teaches what sort of concoction must be set in motion in sicknesses. "Compose the body and permit it to rest," he says, and there Galen, led by analogy or similarity, shows that concoction in sicknesses is of such kind as it is in the stomach. "For," he says, "food having been taken, it is necessary for the nature to rest so that the stomach may concoct"; likewise, that such coction as we wish to be indicated by the urines may occur in sickness, we employ rest and a certain amount of heat, strengthening the innate heat of the solid parts which will convert the humors into their substance to the degree that this may be accomplished. Indeed, this coction is indicated by the urine and excrement, just as the coction of aliment which is made in the stomach and liver. Neither the urine itself nor other pure excrements receive separately other concoction, and we call them raw or cooked because of this, so to speak, indication of the concoction of aliment. If such excrements were to receive separately any concoction at all which did not pertain to aliment, it would give judgment falsely concerning the concoction of aliment, and they indicate this character which they have received just as a distinct character before they are segregated and while the coction of the aliment is occurring. For the nature, as we said, concocts before it segregates, and even though it concocts for the sake of the aliment alone, in the act of coction it alters the entire material subjected to it. Urine serves as an indication of this single method of a concoction in sick persons as well as in healthy, as we showed from Galen a little earlier. Urine is of itself not able to indicate a concoction of bile or of another humor placed separately, but it sometimes *per*

accidens gives the particular signs of such humors when it mixes with them; for example, when fat is dissolved and the urine is odorous, or when in pituitous fevers it is white and in bilious, yellow. Properly urine indicates whether the blood has been cooked or whether it remains raw. After the concoction it is separated from the blood in the veins, and while there it receives color and substance; hence what occurs to it there will give indication of the concoction, *De sanitate tuenda*, IV. Likewise, in order to know what coction is produced through fevers, we observe what crudity arises in them. This is what Galen demonstrates in *De facultatibus naturalibus*, II. "If any one," he says, "becomes feverish, immediately concoction is rendered poorer, and immediately the action of the stomach is hindered by a preternatural heat."

I disregard here the fact that a humor causing obstruction is surrounded by much crudity; not, I say, the crudity of a fully developed humor, but of badly cooked aliment; therefore the humor desires concoction even though it may verge on the melancholic or pituitous. I disregard also the fact that when fever of the dry sort, according to the definition of the disease, is produced, it will be a condition of the body hindering action, that is, the concoction of the dry type. Likewise, in the book *De constitutione artis medicae* and in *De missione sanguinis*, Galen says that the crudity which causes the sickness is not of those humors, but a frustrated concoction of aliment. Therefore, since this is the crudity of fevers, what other concoction, I ask, would you desire in fever than that by which aliment is concocted. In the fifth discourse I shall show from Galen, Celsus and other ancients that this concoction should be carefully observed and aided. I shall prove in the second discourse that other concoctions of fully developed and already putrefied humors, as taught by Manardus and the Arabs, are pure dreams. Now, just as from *De epidemiis*, I, we

said that concoction of natural aliment and of humor vitiated preternaturally were the same, so from *De simplicibus medicamentis*, V, we shall consider this, where Galen in chapter 5 speaks thus: "In that manner in which natural alterations of aliment, which arise from innate heat, are aided by a similar heat from without, such are the alterations observed in the movement of pus." And then he teaches that each concoction is aided by heat and the similar things of our nature. In addition, he teaches that the guardians of the concoction of the stomach are the same as those for sickness, *De epidemiis*, I, *De constitutione artis medicae*, *De sanitate tuenda*, IV, and *De ratione victus in morbis acutis*, IV. They are the juices of good food, moderate warmth, applications, poultices, and friction, especially of the feet; according to Aetius, baths, sleep, rest, moderately warm wine. Finally, those medicaments which produce moderate heat and are slightly astringent aid concoction, from the chapter on saffron and the beginning of book VIII, *De compositione medicamentorum secundum locos*. Such drugs which are hotter than these, such as pepper and calaminthe, tend to weaken. You observe that the precautions for concoction are the same; you have seen that the causes and the indications are the same, not differing in sicknesses and in health, and as a conclusion to this discourse: The methods of the maturation of sicknesses and of the concoction of aliment are the same.

Those things which ought to be concocted
Second discourse

In this discourse, and contrary to the now accepted opinion concerning the concoction of the nature, I am about to demonstrate that putrefied, biliary and other secreted humors of this sort are not at all elaborated according to their potency by the digestive or concocting power.

I shall perhaps produce a longer discourse but, candid reader, be patient. For having learned these things you will be able more easily to weigh the value of syrups and to judge to what extent they are of value to a concoction. Therefore let no one deceive himself, believing that putrid matter is concocted in sicknesses or that concoction is the cure of putridity. Indeed, the method learned from Galen is far otherwise. He teaches that the crude, semi-crude, and what tends to putrefaction is preserved from concoction. For what things are putrefied require evacuation and not concoction in any way, *Methodus medendi*, XI, *De sanitate tuenda*, IV, and *Aphorismi*, II, 17. It is not for us to oppose what was written by Galen in *De arte medicinali*, 89, where he said that concoction is an alteration which finishes the putrefaction while the substance remains. The coction, as it were, so completes the putrefaction that from being a putrid humor it becomes not putrid, which is not at all capable of occurring. But the true opinion of Galen is read from his writings as follows: "this being so, for example, fever is kindled by reason of the putrescent humors. The indication of this case is alteration and evacuation. Alteration which causes the putrefaction of the remaining substance to cease; evacuation which carries all the substance from the body. And the said sort of alteration exists as concoction." In this manner, therefore, coction ends putrefaction because it stops it and prohibits its continued consuming or corrupting. In what way, moreover, does the concoction impede the action of putrefaction and stop it? Those can easily judge who now read carefully the cited place respecting the generation of pus. There Galen teaches a mixed action, a natural cause attempting assimilation and a preternatural cause corrupting and putrefying. These two causes struggle with each other so that the one compels the other to cease. However, those things which cause

putrefaction in a dead body, with no innate heat to cause permutation, do not follow the method of concoction. If the nature, contrary to these conditions, changes these things by its strength, they cease putrefying; as is considered in *De ratione victus in morbis acutis*, II. In the second place, Galen can be opposed to us, who says, *De differentiis febrium*, I, 4, that whatever is corrupted is concocted in space of time and rendered benign. I reply that if you understand "corrupt" according to the meaning of the philosophers, that is no more possible than that the same "corrupt" should be reproduced by number; not in this way should *θιερθαγηέρον* be translated, but "vitiated" or "polluted." But because "to corrupt" has been used in the Latin version, the interpretation need not be rejected and it may be translated more clearly thus: "For whatever is vitiated remains in the stomach and liver, and in a space of time, little by little, is concocted and rendered benign." In the same manner Aristotle says that the humor which is putrefied or in some other manner vitiated becomes useful through concoction. But all these things Galen teaches clearly in *Aphorismi*, II, 17. Let us conclude, therefore, that putrid matter is not at all material of concoction; semi-putrid humor is, insofar as anything remains in it which can be assimilated. Whence not unjustly Galen, in the treatment of abscesses and ulcers, never employs concoction for putridity, but consumption, evacuation and digestion, as in the case of a sebaceous cyst, a fatty tumor, a hygroma and in other preternatural things. Likewise, according to the *Methodus medendi*, XI, he says that the [innate] heat of the living body concocts and is able to render useful the semi-putrid and half-bad of the putrescent, and a little later he refers to such a concoction of the semi-crude, as in *De sanitate tuenda*, IV, where he teaches that those things which are unable to incur the favor of the nature must be totally eliminated.

Cocction, therefore, must be required in no disposition except where there is crude or vitiated aliment. In this way a disposition or fluxion, in whatever part of the body, is concocted while the neighboring part attempts assimilation. Then Galen writes in *De compositione medicinarum secundum locos*, VII, that in affections of the artery he attempts concoction through moderately hot substances possessing some force of constriction, so that the strengthened innate heat of the parts may perform the duty of assimilation better. Also he says that contused flesh is concocted, *De simplicium medicamentorum temperamentis*, V, 7, and *Methodus medendi*, XIV, for a juice tending to putrefaction and having been expelled through the contusion, what is able to be reduced is reduced, and the rest suppurates.

From what has been said it is easy to understand that the question of the Arabs and of the recent writers concerning the concoction of bile which must be awaited in purgations is a senseless one. For we, from those things demonstrated, are able to infer that neither yellow bile nor black undergoes any concoction by the nature, nor pituita if it so degenerates into saltiness or any other quality that it becomes completely foreign to the nature of blood and nourishment.

Let us more fully, for the sake of recent writers, prove that these humors ought not be concocted in sicknesses, nor are able to be concocted in any way. First, there is the sacred authority of Galen teaching throughout that what has already been separated cannot in any way be assimilated, and that as soon as we evacuate we assist the concoction of the remainder. For in *Salubrium*, IV, in which he treats of the symptoms of sicknesses, he teaches what in general must be done in regard to harmful juices, and he makes a triple division. In the middle he places blood; to one side of the blood, the raw juice; on the other, the

sharp, bilious, salty and other things of that sort which remain after the concoction of the nature and degenerate through having acquired a harmful quality. Thereafter he says: "There are two things which one who treats affections of this sort should note; the concoction of the crude and semi-crude which existed before the perfection of the blood, and the evacuation of the sharp and mordant which follow and are later than [the perfection of] the blood." This passage is so explicit that it is strange that so many and such great physicians are deceived in such a clear light and invent such concoctions as exist only in the imagination of the Arabs and not in reality. Moreover, what was said by Galen concerning the non-concoction but rather expulsion of the sharp and mordant also applies to the atrabilious and the salty pituita. For they are all mordant; and a little earlier he spoke of them, reckoning them among the causes of ulcers, and ordering that those only be concocted which exist before [the perfection of] the blood and are able to be assimilated. Also a little earlier he wrote in this manner: "Therefore it is necessary that excrement, whether it be hot or whether it be cold, either be driven out or at least altered. Not all excrement receives alteration from the nature, since not all food is concocted in the stomach of every kind of living thing, but there must be a certain relationship of that which is concocted with that which concocts. Therefore what is entirely foreign can in no way be made so that it may receive the service of the nature, but as soon as possible it must be endeavored to evacuate it; equally surely those things which have been truly corrupted in the stomach had best be driven out by vomiting or by purging." And a little after: "What is as yet semi-cooked may be concocted, what is not able to be concocted must be expelled." And in the *Methodus medendi*, IX: "The nature of the solid parts attracts to itself the humors suit-

able for nutrition; it expels all the rest." And in XI: "It will concoct what is suitable for concoction; it will expel what can be expelled." The same in *De ratione victus in morbis acutis*, I, 30. What more? All Galen is in this, and he teaches similar things everywhere, ordering concoction of only the crude and semi-crude and expulsion of the rest. He teaches what things are crude in *De sanitate tuenda*, IV. And we shall say in exposition of the aphorism that those things are crude which in the concoction of aliment remain outside the blood. Hippocrates taught us that those things alone must be concocted in sicknesses before purgations; thus his authority will offer us no little assistance. Also the method of designation teaches us that that which demands concoction is the crude, bloody and sharp, none of which can be said correctly of bile since it [comes] after [the perfection of] the blood, and is the excrement of concoction. In addition, Galen, in *De differentiis febrium*, II, teaching what kind of coction there is in fevers, and how these humors which are cast out as excrement putrefy: "The nature," he says, "using its forces, always attempts to assimilate to the parts whatever is nutritive and can be made useful; moreover, it expels that which is not at all of this sort. If on account of density, plethora, stickiness, difficulty of passage, or on account of weakness, it is unable to drive out an excremental humor of this sort which has remained for a long time in the body, necessarily that humor putrefies. For whatever may be the humor, either it receives concoction and is joined to the solid parts or remaining too long in the body, putrefies."

He adds an example concerning bile, which when it is unable to be concocted further, if it is unable fitly to be expelled, causes jaundice, or having putrefied, a fever. Attend, I beg, that he teaches that there is no intermediate choice between these two; whatever it may be, either is

concocted for assimilation or it is driven out. Moreover, concerning bile he taught, just as an obvious thing, that as it is incapable of concoction so it is completely driven out by the nature. For when the concoction of the nature has been completed, these humors will be segregated, and since they remain out of the arrangement of the nature, they are expelled; but if they cannot be driven out they putrefy and kindle fever. Therefore if the expulsive force is faulty what physician is so stupid that he will apply remedies for concoction? Who is so dull that seeing the greatest desire of the nature for expulsion, does not aid it by lessening the abundance if that obstructs, extenuating and comminuting the density and stickiness if that troubles the action of the expulsive force, opening the passage if the narrowness of those things is the impediment, or, finally, strengthening the expulsive force itself? For this is the method of Galen. But barbarous, inept men believe foolishly that these are all functions of the digestive or concocting faculty. And if from obstruction of excrement bad concoction of aliment follows, the concoctive force must then be considered through those aids which have already been mentioned as assisting concoction.

There is another passage at the end of the *De constitutione artis medicae* of Galen which alone suffices to put an end to this disputation. There he proposes that those things which are able to return to a natural state be concocted, and what are preternatural be expelled. Then descending to individual humors, he advises evacuation, not concoction of them, excepting pituita, of which he makes distinction in this manner: "If, moreover, pituita is superabundant, and if salty, it is necessary to attempt purgation, but if acid, alteration, these things aiding the nature in its concoction." It is not that you may elsewhere be lacking other proofs, if you understand what he teaches in this instance, since also you recall bile, of

which he taught evacuation, not concoction. Moreover, he advised concoction of pituita, sweet or acid, because it can be turned into aliment. He teaches the same in *De ratione victus in morbis acutis*, II, 30, saying that bile cannot be concocted since after the concoction of the nature yellow bile is generated from the heat of the blood and black bile from the same heat. He confirms this at the end of book II, *De naturalibus facultatibus*, where he says that a certain instrument has been constituted by the nature for the other humors, through which they may be purged; however, none for the pituita because that alone is capable of concoction. Before Galen had taught all these things Aristotle, discussing in general the concoction of humors and of tumors, mentioned only those tumors which suppurate such as the phlegmonous. Those are not to be believed who deny that Aristotle spoke of concoction in its entirety, but only of aliment, because there he did not mention the concoction of pus which Galen makes similar to the maturation of diseases. Furthermore, from this concoction of tumors you will gain another very important demonstration. For if you read the whole of Galen you will never find that a fully developed humor, such as causes herpes, a clear-cut erysipelas, oedema, scirrhus or any other tumor which is not phlegmonous, is concocted since pus will never be generated from such. If the tumor is a phlegmon or phlegmonoide and if harmful blood is concocted and pus is generated from it, it will be desirable to employ those aids to concocting and moving the pus, which things Galen never employed for other tumors. What will the Arabs reply here? for what reason, will they say, are those humors concocted in fevers and not in tumors? For Galen compares the concoction which occurs in fevers to the concoction of tumors into pus, *De crisibus*, II, 18, and *De differentiis febrium*, I, 7.

But let us consider other reasons and let us take true

demonstration from the same passages as before. The first may be drawn from the efficient cause of concoction. For we demonstrate that the solid parts when they attempt assimilation are the causes of all concoction, and because they effect it not for the sake of the other parts but that they may prepare aliment for themselves. Indeed, aliment cannot be gathered from certain kinds of humors or excrements; therefore the concocting force of those parts will not act on them. The second demonstration is from the very material of concoction, for it has been demonstrated in the beginning of this discourse that the material of concoction is that which through similarity of substance can be converted into natural aliment, which you do not find in such humors.

But Manardus will say: "Those humors, when they are unable to be concocted so that they may be turned into the substance of the member, will have been concocted sufficiently when they have been made similar in some measure to the solid members, and controlled by the nature and rendered suitable for expulsion either through the same nature alone or with the aid of the art [i.e., medicine]. And this has been noted generally of concoction so that physicians name both pus and urine as concoctions." Thus he writes in the first epistle, book XIII. His words seem able to be disproved with greater difficulty in this respect, that they have been taken for the most part, collected here and there, from Galen, *De ratione victus in morbis acutis*, II. Also they have the support of [Alexander of] Tralles, I, 16. It is clear that Manardus, Avicenna and all the others very frequently cite passages in Galen although they seem to be disdainful of them either because the passages do not give them support or perhaps because they feel that we should trust their ambiguities on Galen's authority. Hence it occurs that in their bare discourse, because of their awkward

twisting of Galen's words, we are very often compelled to attack them for offending. Thus Galen with his Hippocrates said that any concoction is to be mentioned doubly, that is, properly and improperly. He does not agree, however, that a concoction is double, but just one, from which it happens that certain things may be said to have been concocted properly, some improperly; as occurs in a single concoction so that one part will be assimilated and another will be excreted; or one may be assimilated more completely than another. But more will be said concerning the remarks of Galen and [Alexander of] Tralles. Now I inquire just this of Manardus, which of the four natural faculties will be needful for the task? And by what method will the nature of the solid parts in some measure assimilate such humors to themselves? And if we grant to him that the nature influenced by denseness will assimilate, what in this regard will assist expulsion? Is not denseness more to be feared? And, moreover, because none of the parts of the body will assimilate such humors to itself as a preparation for their expulsion, will that one who knows that a part of the body acts by reason of its own concocting faculty and not because of providence for the others, grant that in assimilating to itself it may receive aliment? But so remote is the possibility of such humors receiving that service from the part, that we also see that the nature is rather bothered by them and that it acts to expel after it has concocted, and excretes the superfluities according to the arrangement presented earlier. Likewise, in preparing humors for expulsion we strive, especially by reduction, to lead them away from any resemblance to the nature, so that they may be driven out more easily because dissimilarity is the cause of expulsion; similarity, on the contrary, of attraction, retention and concoction. For this reason Manardus also makes a distinction between things extenuating and things concocting, saying that things ex-

tenuating lead away from the similarity to the nature; the concocting lead to the nature. Likewise, that such excrementous humors might remain in the body is the fault of the expulsive faculty, as we have already deduced from the book *De differentiis febrium*. Therefore, aids must be given the expulsive faculty but not to the concocting, and these aids by extenuation will lead away from similarity to the nature; but not such things as assimilate through the production of density. But Manardus will say this occurs, as in the case of pus, so that the nature attempts an assimilation which it does not achieve. This similarity would have to be admitted if the material of fever were of such kind as that of pus. Indeed, pus is generated not from those fully putrefied humors from which fever results, but from blood taking a semi-bad—as someone has said—quality from material neither truly benign nor truly foreign, as Galen testifies very fully in *Aphorismi*, II, 47, and *Simplicium medicinarum*, V, 5, and at the end of book I, *De praedictionibus*. And so that sanguinous material, from which the nature in the generation of pus attempts assimilation, holds something which can effect relationship in similarity of substance, for which reason the neighboring parts of a phlegmon undertake concoction; otherwise, inflammations are concocted in no other way. That the parts neighboring a tumor may not by chance obtain to perfect assimilation results, as I have said, from reason of putrefaction which opposes that assimilation. This cause of putrefaction, if we believe Galen, first converts the blood into a humor before it causes it to putrefy—for in the case of pus the blood is not converted into other humors because it would not putrefy—whence so far are those humors from being concocted that they are rather the servants of the cause of putrefaction and depart entirely from the method of concoction.

Furthermore, a thing happens in fevers similar to this

maturity of pus; not that pus is ever able to be generated from the conjoined material of a fully developed and putrid fever or anything similar to it, but from the antecedent blood which is corrupted, or when some tainted blood is mixed with the putrescent humor, whether, as frequently occurs, from aliment or a related juice, and the more so in this instance because the whole coction of the stomach and of the liver is usually disturbed in fevers and much crudity of aliment arises. For this reason, just as in the case of pus, so here the nature labors in concocting, attempting assimilation to resist the cause of putrefaction. The putrefaction having been impeded and having attained an assimilation not of substance but of color, it brings forth what has a resemblance to pus, of which sort is the hypostasis of urine. Consider, therefore, that neither pus nor sediment of urine can arise from those genuine humors, for it is not true that such sediment will indicate the concoction of the humors. This thing is notably ignored by the ordinary physicians because they do not see that the nature acting in orderly fashion has segregated such humors after the first concoction so that it may expel them entirely, and so they require the service of only expulsion and not of concoction. Often, however, they are not soon expelled either because they do not trouble or because they lie under impediments, as related in the book *De differentiis febrium.*

However, they must be expelled in some manner; if necessary, extenuated and comminuted. Indeed, such extenuation and breaking up, if one correctly observes the natural faculties, concerns the expulsive, not the concocting faculty, as will be declared in the following discourse. Moreover, of how much assistance it may be whether you aid the expulsive or the concocting faculty Hippocrates, in addition to others, teaches us. It was his usual judgment that the diet be lessened lest the concoction of the disease

be hindered; however, in *Regimen in acute diseases*, I, upon the appearance of healthy and cooked sputum, he ordered potions to be increased up to the crisis so that he might aid the expulsive faculty to expel since the concocting faculty no longer was in need of assistance.

But let us return to the hypothesis. A third demonstration will be added to those aforesaid with the argument taken from those things which are able to assist the concoction of the nature. For the Arabs are able to proffer no syrups which lead those humors to assimilation to the nature, nor will their syrups act, just as in the case of dead bodies, without the nature co-operating, which Aristotle and Galen oppose by attributing the efficacy of concoction to innate heat. For according to these authors, those things concoct which increase and strengthen the innate heat so that it will assimilate more powerfully. But this reason does not hold good for material completely unable to assimilate; and for such those humors cannot be concocted.

A fourth demonstration which is worthy of repetition may be taken from the same arrangement of the nature. The nature first concocts; second, it separates; third, it expels. If, therefore, after the concoction those fully developed humors have been separated, it remains that they be expelled and not that they be concocted again.

The fifth demonstration may be taken from the end which the adversaries attribute to their concoction. For they say that the end of this action is the victory of the nature, or expulsion. But we shall teach from Aristotle and Galen that in whatever manner the nature concocts, it is done by thickening, and that the thickened material is not attracted by a medicament as easily as a tenuous material, as will be demonstrated below; therefore purgations are very unsuitable for that end of concoction, for the nature would be preparing a greater obstacle for itself

if first it thickened that fully developed humor which it must expel.

I shall add a sixth reason lest anyone be deceived by the crudities of fevers and may believe that in that case those humors are concocted, for that crudity is from the aliment, which is indicated by the urine, sputum and other excrements of food expelled from the intestines. So that there may be a positive demonstration, let a disease be proposed resulting from some one of those humors without crudity of aliment, such a disease as may be caused from yellow or black bile or from pituita, as Galen teaches in *De differentiis febrium*, II, 5, and *Simplicium medicinarum*, VI, chapter, "De atriplice." In such disease produced from bile, will you say that a concoction of the bile must be made before we purge? Nowhere is it read among the approved authors. But rather, if we may believe Galen, Rufus and Aetius, as soon as possible after extenuation and breaking-up we purge the obstructing and stuffing bile, just as Galen in this way cured several on one day, end of book IV, *De locis affectis*, and *De natura humana*, I. Rufus had taught the same things, as Aetius cites in the treatment of jaundice. By Hercules, he who delays purgations for such lamentable reasons ought to be considered the enemy of the nature and one who wishes to compel the nature to enfold and concoct that humor again, a danger which it is striving so greatly to expel. But what about oedema and hydrocele? Shall we attempt to concoct them? A matter truly very foreign from the goal of Galen, as ridiculous as one concocting the flatus in tympanites.

I believe enough has been said in proof of the proposed thesis, so that no honest person will object if now the opposition's reasons are destroyed by us. First, there is the frequent doubt concerning the concoction which occurs in fevers and in the crudity of urines, to which has already

been said and again must be said, that concoction is required in fevers not because of the ripe humor but for other causes, and that crudity appears in the beginning of the fever.

First, the nature disturbed by the inrushing sickness interrupts the accustomed coction; thence arise the crudities in the beginning of fevers and crude urines. Likewise, since all fever is sufferance of a venous sort, the sickness for that reason will be one affecting action, so that concoction of the other affected part will normally be impeded. Likewise, the harmful humor mixes itself with the aliment in the veins which not alone disturbs the concoction but imbues the urines with its color; wherefore in a pituitous fever they appear white, in a bilious, reddish, *Ad Glauconem*, I. There is another peculiar crudity of the obstructing humor which, when it is fixed in some part is concocted during the whole time of the sickness up to the crisis, *Aphorismi*, I, 22. These two crudities are indicated by the urines which after concoction receive white sediment on account of some assimilation of juices made by the nature, from which the urine is separated. But, you will say, does the nature receive so much aliment in a condition of sickness that it may be said to concoct the humors by reason of assimilation alone? I say that the nature labors especially to develop putrefaction not otherwise than when pus is elaborated, so that good juices may be preserved from contagion. Those which now have been infected, but not, however, putrefied, compel the nature to resist more strongly, and by no other force than concoction or assimilation it struggles against the putrefying causes which by corrupting lead the humors away from similarity to the nature. The solid parts do this for the sake of nutrition and as a natural function although they are not then nourished.

But you will not say simply that they are not nourished

because we employ a very slender diet in the condition [of sickness] lest we divert the nature by too much food. And if the nature possesses considerable strength, it will gather some aliment from the crude and not very harmful material. But if because of the resistance of the cause of putrefaction it does not attain it, nevertheless, as in the case of pus, it will attain a similarity of color. For the crisis is difficult and dangerous to the degree that the nature is less able to assimilate. If it achieves no assimilation but the putrefying causes are victorious, the urine always remains without sediment or it acquires some other infection and death follows.

Second, it can be objected to our argument that those humors are also concocted by a true concoction because certain parts are more bilious or pituitous than others and not nourished by blood alone, and therefore the other humors will be concocted. This objection will not embarrass me who contend that neither pure aliment nor pure blood is given or not given. I assert this only, that all concoction is attempted by our innate heat for the sake of nutriment, and that fully developed and corrupted humors which are unable to nourish are not able to be concocted. Therefore I do not deny that the spleen is nourished from the melancholic blood and the other parts from the more bilious or pituitous, for there are as many concocting faculties as parts, *De naturalibus facultatibus*, I. However, concoction is not performed for the sake of that humor which must be segregated, but for the sake of that which must be assimilated, for the spleen assimilates to itself the purer part from the melancholic dross and concocts for the sake of it. And so the melancholic juice is able to be concocted only with difficulty, as Galen says in the book *De constitutione artis medicae* where he calls the melancholic humor difficult of concoction; but because there are many vessels in the spleen, that dross may be extenuated and

elaborated by the power of the innate heat, and the most pure part of it collected into the aliment of the spleen. Now if the melancholic juice is harmed in any place or semi-putrescent in diseases, the coction or maturation of it will be much more difficult. Then not only will that juice be difficult of concoction but, as Galen says, it will almost have to be called black bile. And, indeed, if it be fully developed it can in no manner be concocted, but it is expelled as greatly opposed to the nature—this notwithstanding Galen's place in the book *Quos oporeat purgare* where he says: “In the beginning you will evacuate the serous and tenuous juices; however, you will await concoction in the thick and viscous—pituita and black bile are of this nature.”

A little later he adds: wherefore coction is to be awaited since the nature separates the humors from the concoction. If therefore those humors are of such kind that something benign can be affected out of them, the concoction of them must be awaited. And if the excrements are entirely alien to the nutrition, as yet the concoction of the sickness must be awaited because, after the concoction of those things which must be concocted, the nature will repel better those things which must be expelled; the more so for this reason, because such obstructing excrements are usually accumulated by the considerable crudity arisen through fevers, so that in that case the concoction or maturation must be awaited, since the tenacious and thick excrements cannot otherwise be expelled. Galen does not therefore say that the concoction of those humors must be awaited, however that may in part be true, but that in such cases the concoction of urines and of the whole disease must be awaited, which is always true.

In the third place, you can object that the biliary humors, the one pale, the other yellowish are said to be

more or less cooked. Likewise, bile can receive another alteration, nor does the nature so drive it out that it is able to do without it. I reply that the nature is never without those humors, since it is always nourished from blood moderated by them and since it always segregates them from the aliment, nor does the nature expel them unless it is overburdened. But after they have been segregated they then become an obstacle to the nature so that it constantly expels them, driving these into the gall bladder, those into the spleen. Should you say they undergo alteration through the nature: if you speak in a general way of alteration, I am not unwilling to concede it; however, if we speak in the manner of Galen, there is no such alteration through the nature but, just as in external things, the action is performed by contraries through contact and reaction. That the bile may be called cooked or raw is not quite properly stated by Galen, but just as in urine, their consistency or color depends on the perfect or imperfect concoction of aliment—from which these superfluities are excreted. For in no way do those humors receive another complete concoction from the solid parts. What value is it to the liver finally to concoct a bilious humor—which has remained somewhat raw or cooked or somewhat pale or yellow from the natural concoction of the blood—if it must in some manner be expelled? And so in no way is bile more amply concocted by the liver, nor ought we to attempt it by the art, we who are the aiders of the nature, not the fashioners of new concoctions. From this you will the more wonder at it and scorn the dross of the blood, which although it may be useful to the nature and serve as aliment for some part of the body, yet since the liver does not require it, in no way does it attempt the concoction or elaboration of it; but when a concoction has been made of good blood, after the nature has segregated the dross, straightway it expels it. The spleen, be-

cause it can assimilate something of this to itself, achieves concoction; then without further concoction it attempts to expel the remainder. If expulsion is not achieved, obstructions occur in which not the concocting faculty but the expulsive must be aided. Since such action is that of the individual parts working for their own use and not for the providence of the others, and since they occupy themselves merely with expelling those juices which can be useful for the other parts and in no way attempt to elaborate them for the others, how much the more do they drive out those which can be useful to no other part? Indeed, what seems more remarkable and is offered by Galen, *De placitis*, VI, and *De naturalibus facultatibus*, III, the best juice and common to the whole body is in no way elaborated by a part after it has concocted for itself and has no further use for it. Thus the blood, which may be called the superfluity of the concoction of the liver, is no more elaborated by it after the liver has chosen its aliment. Not by any other method do the breasts elaborate milk except in seeking aliment for themselves, *Aphorismi*, V, 39. Galen offers the same opinion regarding semen in the books which he wrote about it. Indeed, chyle is a certain superfluity from the concoction of the stomach, and after the stomach takes all it requires it drives out the remainder just as a troublesome burden, *Aphorismi*, II, 18, and in the end of book IV, *De sanitate tuenda*. If, therefore, the nature attempts only the expulsion of useful things when it does not require them for aliment, how much more will it do this in the case of those which cannot undertake the service of the nature? However, there is this difference between these things: those useful things which are now expelled, if the part again requires them it will attract and concoct them. This does not happen in the others which are always expelled unless the crudity of the excrement be such that something of aliment remains

in them; and so that the expulsion may be better accomplished, those things which have denseness are extenuated and comminuted. If anyone should call this concoction, would he say, I ask, that the breaking up of a stone in the kidneys is concoction? Indeed, such a humor is no more concocted than a stone or any other excrement. Likewise, because that extenuation is an operation of the expulsive faculty, if that faculty fails we ought to assist it and not the concocting faculty.

From all this it is sufficiently clear that in the extenuation there is no action of the concocting faculty, nor can it be called concoction. If anyone contends that it must be so called, let him call it if he wishes *scyndapsum* [i.e., a word without meaning]. It is sufficiently clear to us that those who spoke thus have fashioned such things unsuitably and contrary to the manner of the ancients and, ignoring the four natural faculties, have introduced various errors into the medical art. For such fictitious concoctions or digestions would retard or entirely impede the purgation of many things. Likewise they essay digestion by cold syrups so that they may aid purgation, although such may impede it more and make the movements of the nature slower. Syrups are not to be employed as aids to purgations, but only when the aim is to alter, not to purge. But to aid in the expulsion of dense things they have attempted concoction through those things which extenuate and break up, but here they seem to err in name more than in deed, unless sometimes they do it beyond reason or where it is not necessary. All these things we shall consider more clearly in the fifth discourse.

Finally, someone may object to me that I support the concoction of all febrile material. The uncooked blood is, in my opinion, concocted, and this, according to Galen, does not generate a putrid fever; indeed, I do not deny that other juices, generating fever, are concocted. I answer

first, that it is correctly said by Galen that the blood always degenerates into another humor before it becomes putrefied, which occurs particularly in bile. For sweet and fatty things having been [over-] heated become bile-like and bitter, as Galen teaches in the books *De naturalibus facultatibus*, *De crisibus* and *De simplicium medicinarum*; and if there is a dense part in the blood, like dross, that will degenerate into black bile, *De differentiis febrium*, II, 12. From this it will now appear that the material of fever is conjoined pus from the bile, nor can it be concocted; the antecedent material which is concocted is juice or blood, whether crude or putrescent, and so infected that it becomes bile-like. Some believe that there is never this conjoined cause; however, the thing itself teaches us otherwise, and Galen does not deny it in *De locis affectis*, I, and *Aphorismi*, II, 22, for the diseases which are occurring necessarily have an inherent cause resembling symptoms; but the contrary if they have already occurred. And so a putrid fever, since it is alone when it occurs, necessarily has a conjoined cause of each paroxysm which is distributed at the same time with the paroxysm, as we shall demonstrate at the end of the fourth discourse. For this reason Galen does not treat this cause since it suffices to remove the antecedent and to alter the febrile heat, whereupon the conjoined cause disappears. The antecedent cause, whether it be an obstructing and putrid excrement, whether a crude and harmful juice, awaits concoction or purgation; the same thing happens in erysipelas, so that you may say the antecedent cause is not bile alone, but mixed or tenuous blood which, flowing in the beginning of the sickness, arouses all sorts of inflammations. Then it degenerates into other humors which in a certain way may be called the conjoined causes. Nor does Galen argue otherwise in *De crisibus*, II, 12, saying that all tumors arise from bile, pituita or melancholia,

and none from blood; and in the book *De cura per venae sectionem*, all from blood. But *Ad Glauconem*, II, destroys this paradox in these words: "Moreover, blood containing some harmful juice, and which through rheumatic dispositions of that sort flows into the weak parts, causes a mixed disposition, which rarely occurs. For it has always seemed to me that the blood flows tenuous of substance, without pituita, yellow or black bile. But if from another cause the part develops into a tumor it must be considered whether this affection is inflammation, scirrhous or oedema." Therefore, the first fluxion is usually of blood, although when from other causes tumors arise, by those causes the blood may be compelled to degenerate into yellow or black bile, or from the intemperance of the part its pituitous quality is increased, and finally other sorts of tumors occur, even if in the beginning blood alone flowed. And so when in the book *De crisibus* Galen speaks of the febrile material, he says properly that tumors which cause fever are not from blood but from other humors. For if they cause fever, putrefaction is underlying; if putrefaction is underlying, it has another conjoined cause and matter distinct from blood. According to this reasoning there is for Galen no putrid fever from blood as the conjoined cause, since almost all fevers are from blood as the antecedent cause, *De missione sanguinis*. For all fever is an endurance of a venous sort, *De crisibus*, I, 7, by which reason blood may, if its coction is impeded and itself heated, become the antecedent material of putrefaction. For this reason also the letting of blood in fevers is a method of treatment, *Methodus medendi*, XI.

I think I have satisfied the objection and sufficiently declared what must be concocted in fevers and tumors. Recognition of this thing, although it is very highly necessary, yet it is ignored by many. For if a ripe humor causes a tumor, as herpes, erysipelas, scirrhous or cancer, in no

manner will pus be generated there, nor in flatuous or aqueous oedema; nor should we employ repellents for the movements of those things concocting or of those moving pus, but rather the whole should be expelled with the iron or with digestives. For the same reason, if there is putrefaction, as in malignant ulcers, we should not attempt to concoct, but by lime, arsenic, copper-ore, standarach and other caustics to remove it and to burn it out with a hot iron. The same must be said of fevers, that concocting syrups can be suitable for no other purpose except for the sake of lack of blood or of food in the concoction. And since there is a single kind of concocting things in fevers and other sicknesses, no other variety of syrups ought to be allowed in that case, but all concoction must be aided by a little heat.

It remains now to consider the places in Galen and [Alexander of] Tralles cited above so that it may clearly appear to us to be the whole of Galen. He undertook to write out his whole discourse which may be read in *De ratione virtutis in morbis acutis*, II, com. 44. There when he mentions the crude bile of Hippocrates, Galen interprets that passage in this manner: "He then describes all these things, beginning with the bilious crudities. For thus he names crudities as bilious, because he speaks of the concoction of excrements, although when the excrements have been transformed they are unable to nourish the body, like the two biles and the thin dross. But although the nature removes such things, Hippocrates was accustomed to call excrements of this sort, which are dominated by the nature, cooked." We concede beyond this that bilious excrement can receive some concoction when some semi-cooked aliment remains in it. But there is another thing which Galen teaches in this place when he explains how such concocted things are named, that is, this name is understood according to the more general significance

of concoction; it is the general significance of concoction that the nature is stronger than the causes and changes them by its strength. So far is Galen from saying anything contrary to us here, that rather he strengthens our argument by his constant strength, if you will note carefully how he said that this is the general significance of concoction since the nature is stronger than the causes, it changes them by its strength. For the nature having been found stronger than the putrefying causes, or the causes of the pungency of bile, it changes them and prevents them from proceeding with putrefaction or from generating sharp bile. Therefore the coction of bile, as of urines, occurs in this way, that the nature alters and overcomes the causes so that the resultant urine may be expelled more cooked than was the precedent, and then less sharp bile will be generated from these causes. However, the urine, once it has been received into the bladder, is no longer cooked, but the nature concocts and overcomes it when it is acting upon the causes; that is, upon blood which in the veins is dominated by the urine. By reason of this action the urine is said to be overcome and there it has received its concoction. By analogous reason bile, which formerly was separated out as sharp, is not further concocted; neither tears nor other pure excrements of fluxions excreted after the concoction of the nature are purified again. But it is said that all these materials are overcome and that they undergo concoction before they are separated. For then their causes having been overcome, the materials are also overcome, and there they are said to receive their concoction by the nature acting on all that of which such materials are parts. The nature does not act on the parts on account of them themselves but because in all that related [corporeal] substance that seeks to assimilate it overcomes those things which form a barrier, in the same way in which in the assimilation of pus it

struggles against putrefaction that it may cause it to cease. Not otherwise does the nature attempt to overcome those excrements mixed with good aliment and opposed to nutrition, but in order that it may collect aliment, segregate, repress putrefaction and blunt the pungency of excrements by concocting the aliment. If it does not segregate [the aliment] the nature is deprived of it and putrefaction may invade the material and sharp excrements remain. All these things may be called crude and quite properly they display apepsia, indicating that the nature in the concoction of foods was unable to overcome the resisting causes, which remaining unconquered their effects remain also. Therefore crude bile is generally called sharp, yellow and bad-smelling, indicating that the nature has concocted the aliment weakly since it mixed with it the stench and pungency of the putrefying; just as for the same reason yellow sputum is called more crude than the pale, *De crisibus*, I, 5. Who does not see here, even with Galen silent, that Hippocrates discussed crudity of another sort than that which can be concocted? Will you say that he considers the hotter bile to be more crude in order that this may occur?

For if you believe some crudity must be admitted in the bile which desires concoction, you must propose watery and colder bile. For in this manner crude excrements are sometimes expelled, as we demonstrated above from the book *De epidemiis*. Now he calls the crude, sharp and fetid so that he indicates only the powerlessness of the concocting power to overcome the resisting preternatural causes. He does not call it crude because he wishes it to be recooked, since a very watery and cold, serous humor cannot be concocted more unless there is some good juice in it to attract the nature. Now it may be seen clearly with what distortion Manardus elsewhere treated the words of Galen and completely abused them.

As regards [Alexander of] Tralles. In I, 16, he says not absurdly, that infusions, temperate baths, unguents, and moisture-producing foods are employed for altering, breaking up and concocting bilious humors. He took those words from Galen, *De compositione medicinarum secundum locos*, II, where the latter considers the treatment of pain of the head from bile. However, Galen does not mention concoction but often prescribes the drinking of cold water for repression of the heat but not the aiding of concoction. And so Alexander, because properly he mentions the concoction, dismissed the drinking of cold water and offers only remedies which along with alteration can aid true concoction, not because cold water concocts a fully developed bile but the bilious humor of which he speaks, which is just like those serosities in which Aristotle taught that there is something of aqueous blood. For then the nature aided by those hot guardians will complete concoction, so that overcome by the nature, the pus, segregated from the bile by its dryness, broken up and altered by those humectifying things, is more easily expelled, that is, those things which moisten, moderate and soften aid concoction on the witness of Galen in *De ratione victus in morbis acutis*, IV, com. 44. And so from these words of Tralles compared to those of Galen, nothing can be deduced which opposes true concoction. We say only that Tralles has mixed two aims, the quality of altering and the substance of concocting, that sometimes he means fully developed bile and at others not fully developed bile. And if you say that bile is always fully developed, which scarcely ever occurs, I shall say that concocting things can as yet be employed because some of the blood always supervenes, with the pain attracting the fluxion, and because the concoction of the affected part is impeded. Also, concocting things can be employed against the pungency of bile. For if the concoction of the nature is corrected, such sharp bile will no longer be generated.

I believe that in this whole discourse there is no place remaining for doubt unless someone believes the contrary from Aristotle. Wherefore, let us again consider more fully his remarks concerning the ends of concoction, and now we shall have an opportunity for what was formerly not permissible. Aristotle said in *Meteorologica*, IV, 2, that the end of concoction in some is the nature itself, in others another form, as in the case of pus in the tubercles and sordes in the tears. In summation he says that concoction occurs when the matter and the moisture have been overcome. From this it seems to us that these are two contraries: first, because other things than aliment may be concocted; second, because there is another end of concoction apart from assimilation. But the answer has already been given from the remarks of Galen. The tears, once having been led downward into the eye and formed, receive no further concoction, but if the nature overcomes the cause of the fluxion of the eyes so that the liquid is not so thin in the eyes and the sordes appear thicker, this will then be a sign of the concoction accomplished within. This is the opinion of Aristotle and Galen, so that they do not understand the pure excrements as receiving a separate concoction *per se* or as being controlled *per se*, but that they indicate humors overcome within. This is what the following words of Aristotle teach. "Wherefore," he says, "urines, the sediments of the intestines and all the excrements of the body are indications of health and therefore they are called cooked to signify that a humor has been overcome by heat." If, indeed, that victory has been accomplished within, there are certain concealed characteristics which indicate what has been accomplished but not that the concoction of the nature has been exerted on those excrements themselves. Concerning the end, it has already been said elsewhere that the end of the nature is single, that is, assimilation. But because in the case of pus

and in other fluxions the nature does not act alone—indeed, preternatural causes, the end of which is to corrupt and to putrefy, are mixed with it—it happens that the whole composite end which Aristotle considers, is something else from the end of the nature alone, and is that which we with Galen say is always nutrition. But, you will say, are not excrements themselves thickened and concocted in another manner after they have been excreted? I say, the excrements of the intestines are thickened and dried out by the action of the mesenteric veins, *De crisibus*, I, 11, but the concoction of the nature reaches no further. Also pure excrements, such as are called goat's dung, from which nothing can be derived can be thickened from too much retention in the intestines; and when by fiery heat the moisture is evaporated and is removed, on the witness of Galen, *Prorrhetics*, II; the same occurs in the case of the desiccated sordes in the eyes and nares, but this is no more concoction than when excrements solidify into a calculus, scirrhus or callous. For it is not the action of innate heat but of extraneous fire. In the same way it occurs in saliva and retained urines that through fasting there is acquired a saltiness and pungency from an ebullition by fiery heat, not from the concoction of the nature. For innate heat concocts, foreign corrupts and putrefies, *De differentiis febrium*, II, 12. But wherefore in the concoction of inflammation of the eyes does Aristotle make the sordes the end? It must be said that in the same inflammation of the eyes Galen clearly teaches in the book, *De totius morbi tempore*, that first there flows a thin and uncooked humor, then less and denser and having the indication of concoction. Finally, the concoction having been completed within, dense and viscous sordes arise in the eyes in the form of pus so that Galen says that the eyes of those sleeping are thereby stuck together. Properly Aristotle proposes this as the end of concoction—with which we also put an end to this discourse.

*That concoction always causes denseness
Third discourse*

There are those who may say that concoction causes neither denseness nor thinness but always reduces the humors to a certain middle state so that what is dense it extenuates; what is extenuated, it makes dense. But I with Aristotle and Galen shall always say that concoction causes denseness. For the Philosopher in *Meteorologica*, IV, says that what is concocted comes forth necessarily more dense, hotter and dryer. The words of Galen also are clear in the beginning of book IV, *De ratione victus in morbis acutis*. For, he says, concoction compresses and makes all things dense. He says the same in *De locis affectis*, IV, 9. He teaches that in affections of the lung at first the sputum is attenuated and that when it has been concocted it becomes thicker. And in V, 7, he says that at first there is a thin dross which flows down from the parts affected by the inflammation, but upon concoction through inflammation it becomes thicker and more like pus. Throughout the book *De totius morbi tempore* he recounts the signs of crudity from extenuation in fevers, tumors, ulcers and other affections. Hippocrates writes the same on urines, sputa and things expelled from the intestines. For a strong concocting force employing retention surrenders nothing until it expels by thickening it to a considerable consistency. A weak one concocts, retaining weakly, and discharges a thin liquid, as though filtered out; or overburdened, it expels prematurely. Therefore from a weak concoction attenuated excrements occur. But putting aside the indication of excrements, from the very essence of the thing we are able to add several reasons. First, coction is the action of the solid parts on the juices; this action, indeed, is assimilation which cannot be performed unless the juices are made dense; since the solid parts are denser

than the juices, therefore concoction necessarily makes the juices dense. Furthermore, according to Aristotle, the thickening occurs when the moist parts having evanesced, the dry are joined together; and in that way, he says, among all liquids water alone cannot be thickened, since before that could occur the whole of it will have evaporated because there are no underlying dry parts. But in a concoction of mixed things the dry parts underlying remain and the humid evaporate. Therefore thickening necessarily follows. Likewise, since various matter is affected by the heat of fire, after it has been equally mixed it is rendered thicker in proportion to the amount of its cooking. Hence concoction occurs this way in the stomach, since on the testimony of Aristotle and Galen that is similar to a boiling together. Experience also teaches this; that the chyle first having been elaborated, then we always see it to be thickened not otherwise than blood is thickened in the liver. Thereafter in the single parts [of the body] liquid is made thicker by assimilation. This agrees with the fact that when we attempt to concoct something properly, first we grind, attenuate and masticate what is to be concocted. We do it thus so that first a certain homogeneous equalness may occur and the whole may be thickened better by the action of heat, usually not noticing this matter much, not distinguishing that assimilation or trituration, or diffusion of density which precedes the concoction itself, nor aware how all coction thickens. If anyone truly turns his attention to this, from what has been said he will more swiftly disprove all objections. First, someone may argue in this way: the crude humor, properly called, is thick, but that which has been cooked, not so thick; therefore that thickness is removed in the concoction. Furthermore, Galen in *De compositione medicamentorum secundum genera*, I, chapter, "On emplasters which are prepared with silver litharge," says that thickness arises from the

silver litharge which is spread through the power of fire. Third, in the end of the book *De constitutione artis medicae*, he says that what is able to go back to the natural state must be altered by contraries, the thick and viscous by attenuation, the attenuated by thickening, but commonly both by concoction. Fourth, Hippocrates and Galen condemn thickness in urines, intestinal droppings and sputa. For the purpose of weakening these objections it is necessary to remember those things which Galen taught us correctly in *De sanitate tuenda*, IV, where, offering remedies for crudity, first he ordered attenuation and breaking-up and then concoction—if, indeed, in that affection in which there is much crude humor and little good blood, and when no emission of blood and no purgations, baths or both, and no exercise can subvert them, he treated this first so that he might extenuate. Then he added: “If you think that the crude juices have now been sufficiently extenuated you will give wine which may aid concoction.” And a little later: “When crude juices must be extenuated and concocted.” And again: “If a supply of crude juice exists, we have said that it must be broken up and concocted.” Always, you will see, the extenuation precedes the concoction of things. He teaches not otherwise in *Methodus medendi*, XII. But also it is confirmed by reason that extenuation precedes. For crude juices, concreted almost like ice, are thick and cold through feebleness of the heat which is unable to overcome them. Therefore, that they may be overcome by concoction, which is performed by moderate heat, it is of value that they be broken up by greater force [of fire] which diffuses and reduces them to order, as we ourselves do with fire, knife and teeth, concocting, extenuating and breaking up food in the stomach.

Now as to the first argument, we shall say that that complexion or consequence is of no value because the

thickness arises not from the concocting things but from things extenuating and breaking up, which must precede in order to aid concoction. Also, sometimes the thick mixed with the extenuated are reduced, as occurs in the case of chyle, into a more extenuated form as happens in various kinds of edibles which go into the stomach and in the case of silver litharge cooked by fire with water or oil. For this single reason some believe that extenuation occurs in concoction, not because heat extenuates but because there is a liquid mixture. If this were true the nature would never be able through fasting to concoct crude and thick juices, because they would require extenuation which the nature would be unable to perform. But this latter point, as it is manifestly false, so also is the [entire] opinion. For who is able to deny that concreted matters can be diffused by the strength of innate heat, and thickening coldness be destroyed? Therefore not all the force of extenuation will depend on the mixture of liquid, the more so because Galen says that those things which are the thick and viscous parts of silver litharge are diffused by the potency of fire, just as all metallic mineral substances become of more tenuous condition, even though there is no liquid. And extenuating medicaments act by the force of heat, even if they are dry. And so we confess that innate heat can extenuate, but not very much, for moderate heat concocts. However, for extenuation greater heat is required, which you may discover very easily in the elaboration of the thick dross in the spleen. Therefore, in regard to this matter we say that the extenuation itself is the work of heat which can be called the concoction of fire, taking the idea of concoction in a more general sense because in the concretion by fire there is no moderation of the heat. And concoction by fire can also be distinguished from extenuation. Therefore we always distinguish these things in ourselves, because we know extenua-

tion requires greater heat than concoction; and in external things [i.e., outside ourselves] we call some materials the guardians of concoction, others of extenuation or breaking up, and the more powerful are those which extenuate, diffuse and collect. Likewise concoction leads to similarity to the nature, extenuation, away. In elixation by fire, if you introduce any of those things which liquify, not only will it first be diffused, I shall not say as yet concocted, but then after that diffusion it will again be thickened by elixation. Finally, I shall not contend anxiously over words, whether anyone will call this extenuation of juices concoction or make it part of the whole concoction.

The thing itself is explained as follows: nature working in provident manner has acted for the best, so that when some function has been granted to the parts, also a foreseeing control has been granted to realize it, which agrees with all laws. For what is the value of putting me before a magistrate if the power of coercion and other controls are non-existent? And so in this manner nature has given the power of concoction not only that of expulsion but has provided it with the power of extenuation since frequently it is unable to expel unless it has first extenuated. If that alone does not suffice, we aid in addition by the art, not because we say that that extenuation is expulsion, but rather it is a certain preparation for ultimate expulsion. In the same way we shall say that the extenuation which precedes concoction is not concoction but a preparatory aid. I know that the Arabs have attributed all force of extenuation to the concocting faculty alone; but although the concocting faculty may not work more powerfully against such excrements, if there is any action in it of this sort it will be of the expulsive faculty. Likewise, the expulsive faculty is concerned with passage, and it orders the pylorus to be opened, and it breaks the chains of the matrix, in *De naturalibus facultatibus*, III. If any-

one wishes to deny that the expulsive faculty is able to extenuate the humors which are to be expelled, from this account he will not prove that they are impelled to this by the concocting faculty; for in that case the extenuation of them will be the work solely of some external agent. I am willing to grant that that [expulsive faculty] does not extenuate very strongly since very often it is in need of the assistance of the art, and I concede the same concerning the concocting faculty. But not rashly shall I permit all strength of extenuation to be withdrawn from it, since all these functions are derived through innate heat which is able to extenuate. Moreover, the nature would not have provided sufficiently if it had denied to them this necessary function. Experience also testifies that it is not lacking, for sometimes the nature disperses dense excrements through vapor and sweats; therefore it extenuates. Likewise many tumors are digested in which, if we believe Galen, there is no concoction but only expulsion through the extenuating and digestive faculty. And so the Arabs ineptly believe that what is [really] the action of the expulsive faculty is that of concoction, or in place of that name call it digestion; although it would have been a lesser error to name extenuation as expulsion, since it assists the expulsive faculty, just as when it is permitted to concoction, they call it concoction. Truly, considering the thing itself more exactly, you will make a distinction between those things which expel and those things which prepare for expulsion, and between those which concoct and those which extenuate for concoction.

For those contentious persons who maintain their fancies beyond the practice of the ancients, we shall do enough if we say that the concoction of the nature sometimes begins from extenuation, but we always see that finally it thickens, which occurs also in the use of fire. For after a mixture has been made of silver litharge with oil or

water, fire at first equalizes the whole material so that a certain homogeneity occurs through the extenuation of the thicker part, and then the whole is thickened. The same occurs in maturation of fruits, since first there is an earthy acerbity which is then diluted by aqueous humidity and finally followed by thickening. The stomach does the same, equalizing meats and breads by liquids until all are reduced into one chyle. Hence the ancients believed that the concoction of the stomach occurred from grinding, for in the beginning there is a certain likeness to grinding to which the perfect grinding of the teeth is compared. And so this cutting up, diffusion and extenuation to this extent must not properly be called concoction, because it does not occur through that assimilation, but is a certain preparation for future assimilation which it precedes by thickening and making dense. This must be carefully noted so that you will remember in what way extenuation and breaking-up precede to aid concoction. For through them the concocting faculty is aided, just as when those things through which that expulsive faculty is aided are preceded by purgations.

The second argument has been raised over these things: for we do not deny that the power of extenuation is in the concocting faculty; but comparing the function of extenuation to the other ones, we separate it from the special function of concocting; for there is one faculty and many functions just as there are many uses of one part.

As to the third argument, whether the material be of pure aliment, whether of defective, these things we say are done by the nature, the thickening of that which is extenuated, the extenuation of that which is thick; and, finally, the concoction of that which is able to be reduced to the natural state. But concoction of that which is thick occurs after it has been extenuated, as we have already demonstrated and the very words of Galen teach, in which he recalls concoction after extenuation.

As to the fourth argument, no one can deny that in regard to thickening, just as in the case of extenuation, the measure of the nature is surpassed since its temperament is of a kind of mid-quality which is reduced by the force of heat as well as of cold. For on the testimony of Aristotle in the passage already cited, and from Galen, *De praedictionibus*, II, a thickness occurs as much from heat as from cold: evaporation from heat, constriction from cold.

Galen teaches throughout that thickness in urines draws its origin from cold, that is, thick and crude humors. Since, when there exists a supply of thick and crude humors and when some part of them is expelled through urine, as we shall soon say, and if the nature attacks them strongly, a great alteration of the urine occurs. Whence tenuous as well as thick urine indicates crudity, but for a different reason. For in the beginning when the nature is lacking in concoction, tenuous urines are expelled. When much thick and crude juices have been collected, some part of these is expelled through the urines or the nature attacks them by extenuation and concoction, making the urines thick and turbid. Such thick humors, contrary to our adversaries, will return to the natural state if they are diffused by strong heat and are extenuated; and also, if the stickiness of the pituita is present. Whence we shall say that the cause of tenuosity is not concoction but extenuation.

In this matter you will note a remarkable thing approved by the testimony of Aetius, V, 29. Laudable urines, he says, move toward concoction so that first a little cloud is observed upward; second, *enaeorema*⁴ in the middle; third, in the base complete hypostasis terminating in concoction. But in thick urines by reason of the crudity of the collected humors there is a contrary order, so that

⁴ *Enaeorema*, substances floating in the watery part of the urine but without sufficient weight to subside, hence in the middle of the urine and described as resembling globules of oil or, occasionally, hairs.

the thick sediment formerly observed in the base is seen to arise, which thing deceives the many who think it to be the judgment of true concoction. When, however, that which subsides is not that which is semi-cooked and which we have said has resemblance to pus whitened from assimilation of the solid parts, it is a portion of pituitous or crude humor. It is recognized as differing from true hypostasis by a certain inequality because it does not remain continuous to itself, nor as smooth, but like dregs divided up into grains of sand, or rather like thick meal, concerning which Hippocrates, *Aphorisms*, VII, 31. Likewise the whole of the urine is tinctured by that whiteness because it is not in true hypostasis. Furthermore, those crudities usually disturb the whole of the urine and thicken it more. Another difference is offered by Galen, *De crisibus*, I, 12, whose words I shall quote here: "For if it preserves the color perfectly, it will cause much white, smooth, equal sediment, and thus it will be the sign of perfect concoction. Indeed, if it causes a very copious sediment, it demonstrates that that humor called crude has been expurgated." Therefore there is this difference, that the sediment from the crude humor is more copious than that from the true concoction. Hence such crudity, on the witness of Aetius, first appears in the base; then when it is extenuated for concoction, *enaeorema* begin to appear in the middle; when the extenuation and concoction are completed, that which within was of crude humor ascends as a little cloud upward in the urine. Truly, if the humor had not yet been concocted at the same time it was attenuated—for, indeed, in the time in which it is attenuated it is concocted through the assimilation of the attenuated parts—but if all the parts had remained attenuated, concoction would lead them wholly to perfection again by thickening; and as in the case of the aforesaid inspection of urines, what formerly arose would again turn to sedi-

ment below. This is an efficacious argument for distinguishing extenuation from concoction since the former drives the sediment of urine upward, the latter downward; or concoction alone drives downward, extenuation with concoction upward.

To those objections which were raised concerning sputum, a reply may be made from these things. We concede that an excess occurs through thickness, and from each cause, hot or cold; we assert that sputum becomes thick or sticky. In truth, the remedy must be sought not from things which concoct, but from those which comminute and extenuate; humectifying things also are not to be neglected as aids in the expulsion of sputum, *Simplium medicamenta*, V, 12. Whence it is clear that the argument leads to no other conclusion than that things which extenuate and comminute are necessary for aiding concoction, and the concoction itself does not extenuate but causes thickening. Excrements of the bowel, as they are convoluted into twirls or twists in the form of goat's droppings, are thickened and dried out for reasons other than crudities, as Galen maintains in the *Prorrhetrics*, II, and *De ratione victus in morbis acutis*, IV. Indeed, it is because they are retained a little longer and are dried and thickened by the force of fiery heat. The argument, however, gains nothing from this; nor does it happen because of crudity, since such excrements are expelled not even in the beginning of sickness, as Galen testifies in the afore-said book of *Prorrhetrics*.

*Exposition of the Hippocratic aphorism
Fourth discourse*

The Hippocratic opinion which we have undertaken to expound was written as follows: "Medicate and move the concocted things, but not the crude, nor in the beginning unless they become turgid, although they do not often

become turgid." Such is the usual translation. I, nevertheless, say they "irritate" rather than "become turgid," with a similitude taken from lustful animals, as Galen says. There are those who reject those words, "nor in the beginning," which nevertheless Galen reads, as he cites in his commentary on the twenty-fourth aphorism of the same section, and in *De copia medicamentorum secundum locos*, VIII, in *De crisibus*, I, 9, *De totius morbi tempore*, and *De ratione victus*, IV, com. 38. Hippocrates teaches us by those words that humors are more crude in the beginning and that thereafter they become turgid. Also that part has a special power through the thick excrements and fully developed humors which are not crude nor are able to be concocted; nevertheless they are not eliminated in the beginning because first they must be extenuated and broken up and the passages rendered fluid, the more so because crudity which occurs in the beginning of sickness is not entirely the same as that which he calls tumors. The beginning is to be understood as the first and second days, *Aphorismi*, I, 24, and *Quos oporteat purgare*.

Now I shall consider the exposition, taking up [first] the two reasons and then the two ends, one reason for conceding purgation, the second for prohibiting it; or the two ends, considerably later, the one will be a kind of example or canon of those humors which are unable to be purged; properly speaking, that will be the crude humor. The other will be of those which may be purged at any time, and will be the turgid humor. After a comparison of those two ends, we shall consider all the intermediate humors which may be purged or not. The first reason through which after concoction there must be purgation is offered in the commentary of Galen: "Because after concoction we consider that the nature is able to be assisted by drugs," and the same reason [is offered] in the book *Quos oporteat purgare*. For then, with the nature expelling and

the drugs attracting, expulsion follows more easily. The nature expels after the humor has been concocted and separated. After we have explained what things are crude we shall explain whereby there ought to be no purgation in the case of crudities since the other words of the aphorism either have been noted or explained by Galen.

Hippocrates calls the crudities "raw." But for Aristotle there is one thing, "rawness," and another, "apepsia." Galen in addition and elsewhere, as in *Ad Glauconem*, I, remarked: "Of crude or uncooked humors"; so that the first looks to the stomach, the latter to the vessels or the whole body. For "apepsia" is called "inconcoction" or a kind of deprivation of concoction. We interpret this also as crudity, whether it be inconcoction, whether slow and difficult coction or perverted coction. Of these things Galen writes in *De morbis et symptomis*, III, VI, *Methodus medendi*, VIII, and Aetius, IX, 23. Moreover, the humor which is truly called "raw" of which Hippocrates spoke, is especially generated in the primary veins, which are the mesenteric and the internal hepatic, *De sanitate tuenda*, IV, and *De epidemiis*, III, and that especially in children, the idle and gluttonous, *De natura humana*, II. It has similarity to pituita, so much so that Philip [the Empiric] named the crude humor simply "the pituita which Praxagora called vitreous," *De differentiis febrium*, II, 6. However, this is not approved by Galen who permits all cold humors, of which sort is the crude, to be gathered under the type of pituita.

The distinction which he makes between crude humor and that called pituitous, is considered in *Alimentarum*, I, and *De sanitate tuenda*, IV, VI, *De plenitudine*, and *De compositione medicamentorum*, X. From these places it is understood that the crude humor is thicker than the pituitous, less sticky, less humid, less flatulent, similar to pus or the thick sediment of urine or a purée of beans. If

it prevails, there arises from that body a certain discolored whitish, leaden color, or a mixture of white and livid color, irregular pulse, enlarged diaphragm, and other signs, concerning which see *De missione sanguinis*, and *Methodus medendi*, XII. It is clear that Hippocrates is here speaking about such things, or it is taken from his words. Galen also explains the aphorism regarding these things in *De sanitate tuenda*, IV. For he reduces the various differences of humors to three simple types. He places blood in the middle, before it crude [humors] and after it the bilious. Those [crude] ones are from the blood not yet perfected, these [bilious] from the same blood excessively concocted; the former require concoction, the latter purgation. Hippocrates concocted no other humors except those crude ones. Nor does he concoct them so that they may be simply expelled, but upon their concoction he eliminates the excrements which are separated out, or even those humors themselves if they are unable to be assimilated. Therefore bile may be mixed with the crude, or other mixtures may be made, but here we shall never employ the word crude unless something exists in it before the blood [has been perfected], which can be concocted into the blood. And if the humor existing before the blood [has been perfected] has been corrupted into a foreign quality it will no longer be crude. And so natural pituita and also acid pituita will be numbered among the crude. But salty pituita and others, if by concoction they can be turned into blood, we shall in no manner call crude. For the meaning of the word teaches us that we may call crude what has not yet attained the goal of the nature although suitable to attain it. And in view of what we are taught in so many places by Galen respecting the humor properly called crude, we may say that all reason for the crudity of humors depends on this, that on it rests the reason for the prohibition of purgation. So that as in

mixed humors, the greater the portion of crudity, the greater will be considered the interdiction against purgation. But where it is less and the portion of the bilious juice greater, then we are not at fault to such a degree in attempting purgation, because those at a greater distance from the crude approach to the turgid ones placed in the other extreme, for those extremes are not so distant that the same crude humor may not become turgid.

And so the reason for the prohibition of purgation is that the crude humor, because of thickness and coldness, is of slow movement and does not respond to drugs; whence bad symptoms result and become worse in the degree that the drug is more powerful in attraction and the humor, because of the greater thickness, stronger in resistance or more fixed in the narrower passages. And so from such a struggle there will be aroused gripes, irritations, faintness, nausea, poor pulse and dizziness, *De sanitate tuenda*, IV, *Aphorismi*, II, 9, and *Quos oporteat purgare*, I. Likewise, medicaments consume and waste the healthy parts, and the body is weakened and a greater sickness breaks forth, *De ratione victus*, IV. Furthermore, attempted purgation by disturbing the nature will impede future concoction which will be aided by quiet, as Hippocrates writes in the same place. In addition, not only must the crude humors then be expelled, but others which are unprepared for expulsion if they are blocking the passages of the crude through which the others must be eliminated. For if by their thickness and slowness they persist and obstruct so that they are not expelled, they become an impediment to the others so that they too may not be expelled, as Galen [wrote] elegantly in *De sanitate tuenda*, IV. And since they are especially generated in the mesenteric veins and the interior hepatic, they will not be an impediment to expulsion of the humors from the belly. But since their transit will be through the primary veins,

they will not permit those of the other parts to be expelled unless first they, having been extenuated and broken up, are concocted or are in part expelled cautiously by bloodletting, *De missione sanguinis*. In the same manner we put bloodletting prior to purgation so that a medicament upon discovering empty passages may attract the juices without impediment, *De renum affectibus*, and *De missione sanguinis*. You have the reason of our aphorism, which does not prevent you from moving the bowel with a slight drug, because the crudity of the primary veins does not hinder the elimination of excrements from the belly since such elimination occurs from soothing rather than from attracting the juice.

What happens if there is crudity in the stomach? I reply, if it is only food recently ingested, concoction must be awaited; if there is excessive inebriation, it must be vomited thence, on the authority of Philotimus and Praxagora, as Galen teaches in *De sanitate tuenda*, IV. The same from Apollinarius in *De compositione medicamentorum secundum locos*, II, in the treatment of headache after inebriety; the same, Aetius, IV, 51. Nor is it safe in this case to await concoction of the juices, for they are more swiftly corrupted than they are concocted, and if they are concocted, with the concoction opposed, the veins will become replete, as Paul says, I, 32. Also headache occurs from the vapors of foods, as Galen teaches in the beginning of the book *De remediis paratu facilibus*. Therefore there must be vomiting without delay just as when there are sour and reeking eructations, *Methodus medendi*, VIII. The reason of our aphorism forbids elimination of the crude humors from the stomach through the bowel. For the crude humor is slow in movement, the transit of the pylorus narrow, and the twists of the intestines many in which the humor may be delayed and especially in the supporting mesenteric veins. And so for

the best reason they are expelled rather by vomit by the ample path of the throat, just as in the case of the turgid humors, because they are harmful and not yet strengthened. Just as the others which rush through the intestines are led through the lower parts, also before concoction, because we number them among the irritating or turgid, and whither nature turns we follow. For the same reason we expel the pituita downward by the bowel since Galen, in the end of book II *De natura facultatum*, teaches us that it may not be evacuated from the veins, but swiftly from the belly in that way in which the crude humors are sometimes expelled, in the book *De plenitudine*. Nor should you be amazed that I grant permission to purge the turgid in all unfixed humors verging downward. For such are called turgid and thus Galen explains in *De compositione medicamentorum secundum locos*, VIII, in these words: "Hippocrates properly considered that medicament is worthy for concocted things, but not for the crude nor in the beginning unless they irritate or swell; that is, unless movement toward excretion is in action and as yet there is no part with a strong inclination and position toward one direction." The same occurs *De ratione victus*, IV, where he says that immediately in the beginning there must be purgation before the humors are strengthened in some part; those might almost be called turgid which have not yet impacted.

Now we have presented the sum of almost the whole aphorism. But all things ramify, and if we examine exactly the reasons of Manardus, the differences of Avicenna and Rhazes concerning concoction of bile, or its purgation in the beginning, since none of that can be coction, as we displayed, they ineptly dream of concoction. But I shall soon consider whether without other preparation bile can be purged in the beginning [of sickness]. For with Galen I shall advise elimination in the beginning, not only of fully

developed bile but also of serous humors even if they contain aqueous blood which can be concocted, and for a very good reason. For just as those properly called crude and those which approximate to them must not be purged, so the turgid and those which approximate to them, which are tenuous, must be treated in the same way. But first we must consider a few things with Manardus. For he, in the place cited by me, seems to wish to deny this aphorism and, as it were, opposing it adduces many arguments to persuade to the purgation of crude [humors]. First, in the beginning of diseases he swears that purgations are desirable, employing cassia fistula, dispheonicon, diaprunis, etc. But although these things are partly true, they do not contradict the opinion of Hippocrates and Galen. Nor are drugs which lubricate the belly and expel materials from it prohibited by our aphorism, as we explained. For in this way not a crude humor but excrements are attracted, and our aphorism prohibits the attraction of the crude but not the excrement of the bowel. For Hippocrates and Galen employed those purgatives in the beginning, and also Hippocrates, *Regimen of diet*, IV, purges in the beginning with cooked ass's milk. Galen also uses those prepared purges so that the body may be rendered fluid, and he usually did this by foods as well as drugs, as he announces in *Methodus medendi*, XI, where he mentions mead and foods which liquify the belly, and drugs which are able moderately to stimulate.

In this class he places our cassia. Furthermore, without awaiting concoction, as in the turgid humors, we purge those things which are troublesome to the belly—and this the more so when drugs purge by lubricating but not attracting strongly. For what Hippocrates and Galen fear is the attractive strength of the drugs which, with no humor to expel, usually arouse bad symptoms. Also the nature itself at the first onset [of sickness] often expels

bile or pituita through vomit and through the bowel; therefore it might be harmful not to imitate the actions of the nature since the argument of the aphorism supports us; because we consider the nature as aiding the drug, and that the more because such excrements are unable to be concocted again as has already been demonstrated; and to the degree that it is prone to evacuate them when they verge to the lower parts to be expelled by the nature. Therefore in many things Manardus speaks the truth, but ignoring the meaning of the aphorism he illogically condemns it. For by the same reason we expel the aforesaid humors, even where turgid, because we consider the nature to be aiding. By like reason, in tertians Galen, *Ad Glauconem*, I, expels the bile flowing to the stomach. And Hippocrates in *Regimen of diet*, IV, also in the beginning purges with scammony when the belly murmurs, as we ourselves do with safety with proper drugs. For it is obvious that we ought to expel such a turgid humor which through irritation arouses a murmur. Furthermore, the way is broad and the transit is not through a narrow region such as the hepatic veins in which crudity may greatly impede purgation. For the reasons contrary to the aphorism have no concern with those things which are expelled upward from the stomach and downward from the intestines, since the exits are wide and short, and the humor quasi-turgid or at least not fixed. In all these things since there is much to be considered, as much from the kind of humor as the disposition of the body, Hippocrates correctly said that he who attempts to purge in the beginning must give much thought to the matter beforehand. Not because much consideration is required for easing the bowel, but for expelling the part of the humor which is noxious, as in the case of a turgid one; for then it is necessary to decide what kind of humor it is and to what extent it is turgid or fixed.

In regard to the disposition of the body one must consider through what passages the humors ought to be expelled and whether they have been sufficiently opened or not; also other things must be contemplated, respecting which compare *Aphorisms*, I, 24. Now let us return to Manardus who made every effort to destroy the aphorism. Quality, quantity and place, he says, very often compel us to evacuate before concoction. Concerning quality in turgid matter he approves what we confess and the aphorism has expressed. Concerning quantity he adduces many things, so that more than in the preceding case he requires more than the quality of turgidity and the use of purgative drugs even in crudity. For this reason he recommends purgation more strongly to our gluttonous and intemperate age.

But if we purge our age more audaciously, I believe it is because of milder drugs, not because of voracity which was the same in Galen's time. Furthermore, if there is redundancy from voracity, I have shown that it should be expelled by vomit. If there is any other crudity in the body Galen offers a method of treating a multitude of crude [humors], *Methodus medendi*, XII, *De sanitate tuenda*, IV, and *De cura per venae sectionem*. If on account of the excrements of the bowel you recommend purgations in the more gluttonous, we have previously conceded that in regard to these droppings of the bowel there is no contradiction of our aphorism. Because of the gluttony of our age, to recommend purgation is not in conformity with Galen who for such cases counseled the rich to be bled, *Methodus medendi*, XI, because many had a congestion of juices from luxury and intemperance in food. For bloodletting is proper to reduce the indiscriminate abundance of the humors since drugs attract rather the secreted humors which you may not find in crudities after gluttony. But Manardus says that there is

abundance of crude [humors] in fever and does not advise venesection, and that the treatment must be essayed through frictions and diet, which Galen offers in *Methodus medendi*, XII, or, if the forces are weak and the patient is despaired of and death predicted, there is nothing to be done. But if you assuage the belly with light drugs and ease it from excrements, very often as we have already said, that evacuation is not forbidden by Hippocrates because it is not evacuation of crude humors; indeed, evacuation of the bowel is permitted when venesection is not permitted, since the belly having been freed and the passages opened, the nature also more easily expels some of the noxious humor. But if by more powerful drugs you attempt to expel the crude humors downward through the bowel, you will adduce bad symptoms. Therefore I do not see how quantity requires purgation of the crude humors except in this one way which Manardus, however, did not favor. For from superabundance it can be estimated that some humor is swelling and must be separated out and expelled, as Aetius believes, III, 23, and Galen, *Aphorismi*, IV, 1. Therefore quantity requires purgation not because of the amount but because of turgidity.

Also the quantity of a fully developed humor requires purgation, as Galen teaches in *Methodus medendi*, IV, but here we are talking of the crude. Manardus, who considers himself the interpreter of Avicenna, in the first *Fen* of the third book, first tractate, chapter 29, says, "when the ebullition of material is feared if we await concoction, as the material, diffused and increased by the heat, causes painful distention, it is safer to begin with evacuation so that the remainder may begin to be concocted." If by evacuation venesection is understood, these words are true, and offered by Galen in *Aphorismi*, II, 29. But Manardus does not fear to attribute to purgations what is proper to

venesection and to interpret the word "evacuation" as purgation, contrary to the very exposition of Galen, II, 17, and *De praedictionibus*, II, com. 14, who says in his *Methodus medendi*, VIII, XI, that when through venesection the larger part of the harmful juice has been expelled, properly we attend the remainder with another remedy, for the nature having been alleviated, the rest concocts more quickly. And so it is proper to venesection to diminish the material which ought to be concocted, so that the remainder may more easily be concocted, in the book *De curatione per venaे sectionem, De sanitate tuenda*, IV, and the aforesaid 29th aphorism. It is characteristic of purgation correctly performed to expel not blood but secreted materials, *De natura humana, De atra bile* and *De purgantium medicamentorum facultate*. For the materials which the purgation eliminates can be concocted either in no way at all or with great difficulty; indeed, concoction is impeded by the agitation of the body, *De ratione victus*, IV, com. 44. But I said with difficulty, because of pituita and other serous recretions which also are expelled because they nourish with more difficulty and descend easily. Likewise there is the Hippocratic rule that purgation should evacuate such things as the nature willingly and usefully is accustomed to expel. Manardus did not see that the nature in the beginning usefully expels the part of the blood poorly concocted. But he, following a common error, believed that this crudity is of those secreted humors, although actually there is crudity of blood in the beginning of diseases. If there is anywhere a secreted humor, we shall speak hereafter of its purgation.

Now it is enough for us to indicate that true crudity in the beginning of diseases, which is indicated through urines and which prevents purgation, is of the same blood itself or of the aliment. Observe now, reader, how ineptly

purgation eliminates a part of the unconcocted blood or of crude and thick humor; nor, if you know what you are doing, will you ever use such minorative. But if you wish safely to diminish—if this is to diminish—expel only the common materials or excrements. For usually from such sequela some noxious humor is secreted by the opened passages and expelled since the nature alone and without our aid usually accomplishes this through paroxysms. Furthermore, it will be permissible to employ drugs, considering in advance whether the humor is redundant, swells and flows together to the belly, or whether it is sufficiently mobile and without crudity impeding it much. Nevertheless, one must not believe rashly that by a minorative drug one can cut in two that crude material fixed in a place and carry away part of it; for neither our aphorism nor its argument grants this. However, Hippocrates permitted purgation of unconcocted things with the aforesaid considerations, but solely in the beginning and not at any other time, because at no other time will you find the humors so mobile and irritating since afterwards they usually become fixed in some part. This Galen taught clearly in *De ratione victus*, IV. Either immediately, he says, at the beginning before the humors have become established in some part or afterward when they have been brought to maturity, they ought to be medicated. Also for another reason, purgation is to be permitted in the beginning because then the symptoms are slight. Whence Hippocrates, offering the reason for undertaking purgation in the beginning, said that around the beginning and at the end the symptoms are weaker. Nor must purgation by attracting drugs be often undertaken in the beginning since Hippocrates says that in large part the humors do not become turgid. For only in those sicknesses which are of short duration does it happen that the humors swell since in such sicknesses they are tenuous and

mobile. They never swell in long illnesses but are fixed and thick, so that Galen always orders concoction to be awaited in them, *Aphorismi*, I, 24. Nor is there place then for that conjecture that if something appears to need moving, move it. Therefore it is not from this aphorism that Manardus can believe that purgation is permissible in the beginning, since Hippocrates' rule which follows is chiefly for venesection, "If anything is seen which needs to be moved, move it"; since also in another aphorism he says that there must be purgation only rarely in the beginning; and in ours, only when the humors swell. For all permission for purgation in the beginning depends on that reason of swelling, just as all prohibition, on crudity. Permission is granted in the case of the turgid humors only when they are tenuous, bilious and those arousing motion or those breaking forth somewhere, or at least not fixed; but in all these, permission depends on the degree to which crudity or viscosity impedes.

In the third place, apart from quality and quantity, also the reason of site requires purgation of the crude humors in pleurisy, which we shall soon demonstrate to be false. If he had said that the place was the belly, we would more readily have agreed to purgation, but it was said for a quasi-swelling humor verging thither, and from this we consider that our aphorism does not fail because of any of his exceptions but remains constant and exact. Then Manardus cites various places in Galen in which the latter purged without awaiting concoction, as in ulcers, wounds, cacochymia, alopecia, achores, headache, inflammation of the eyes, etc., *Methodus medendi*, IV, XIV, and *De compositione medicamentorum secundum locos*. It must be warned that evacuation of the whole body is advanced by local medicaments when there is no fever or crudity of a venous sort which arises in fevers. Whence rightly Galen purges the whole body without awaiting coction, for how

will concoction be awaited when there is no crudity? For if from a healthy body and one without cacochymia, you wish to eliminate a humor, you will not await that concoction which the barbarians always and ineptly attempt with their syrups; and they err much more by giving cold syrups, which are to be employed in fevers for another reason, as we shall say below.

Now it is enough that concoction be not awaited nor attempted where there is no crudity. And if in achores, cephalalgia, phlegmons and like affections of those parts, crudity in that site occurs from fluxion or from aliment destined for that part, the crudity is not strongly indicated by urines nor does it impede the purgation of the whole body. Indeed, the materials of such sites are usually eliminated not through the bowel but through other passages, as Galen teaches in *Methodus medendi*, VII, XI, XIII, and *Ad Glaucconem*, II. But if a humor, in whatever part it may be, must be eliminated through the bowel, if it is crude it will, according to the rule of the aphorism, be eliminated after concoction. On the testimony of Galen in the book *Quos oporteat purgare*, "Those juices which are fixed in a certain part of the body must be moved by no other aid, nor medicaments employed before they are concocted." The same in *Aphorismi*, IV, 1, and *De compositione medicamentorum secundum locos*, VIII, where respecting inflammation Galen also commends this aphorism which Manardus belabors. Nor does he approve the elimination of a crude humor, in whatever part it may be, before concoction. But with a crude affection existing in some part and no crudity in the veins or the stomach, we evacuate the whole body by revulsion lest anything flow into the affected part. Our aphorism does not forbid this.

Finally, Manardus cites Galen and Hippocrates in the book *De ratione victus in morbis acutis* as those who employ purgation without the material either turgid or

concocted. We, on the other hand, say that if the urines remain crude, purgations of that sort are prohibited by Hippocrates, and Galen, *De usu partium corporis*, IV, com. 43, says that purgation must be completely avoided where there is crudity in the humors. But in *morbus lateralis*,⁵ he says, Hippocrates purged in the beginning, and Galen recalls that he employed medicaments on the pocrates orders purgation in books II and IV when pain first, second, fourth and fifth days. We confess that Hip-infests those parts which are under the diaphragm. But we do not at all concede that he ordered it in the beginning of sicknesses since previously he appears to have recommended the endurance of the pain and did not alleviate it by various fomentations. But we confess that he spoke of employing purgation in the beginning, for thus Galen explains and Hippocrates himself then orders the fomentations to be removed, and purgation or venesection to be attempted. Manardus ought to consider the difference that has arisen between Hippocrates and Galen over the admission of purgation and consider on the basis of ex-tended turgidity that according to the opinion of Hippoc-rates, "If anything seems to require movement, move it" and that that is to be done rarely and with much pre-meditation. It is desirable and even necessary that we repeat all these things and how they ought to be judged, so that it may be considered to what extent the material becomes turgid, verges downward, or is mobile; and to what extent there is much or little crudity and to what extent the body is suited to purgation and prepared by open passages and extenuated humors. And so in these considerations a difference has arisen between Hippocrates and Galen, and each has a reason. For Hippocrates purges material in the beginning when it is swelling and turning downward to the parts below the diaphragm. But Galen considers this dangerous, fearing—as Paul [of Aegineta]

⁵ *Morbus lateralis*, pain or disease of the side, "pleurisy."

says in the third book—the perturbation which purgation might arouse if the crude humor resists. Likewise, Galen, because of the heat of acute fever, avoids attracting drugs which are hot. Finally, he says it is dangerous in acute disease to err in the employment of medicaments, *Aphorismi*, I, 24, but because our approved drugs act mildly they are not so much feared, but also they attract less strongly even though they may be aided by a pectoral decoction. Nevertheless Manardus proves nothing of any sort against the aphorism, for, from the aforesaid reason of turgidity, purgation is permitted in the case. Nor can he beg any decision from the fourth book. For with the fourth day Hippocrates, or whoever was that author, teaches purgation in pleurisy; Galen, defining the whole thing according to the precepts of the aphorisms, says "not always must purgation occur on the fourth day, but either in the beginning upon the swelling of the material, that is, not fixed or with concoction awaited." Whence it is gathered that sometime in the first or second day he gave medicaments when some humor, as yet fixed in no part, was wandering through the body, but sometimes on the fourth or fifth day with concoction already apparent. Behold the clear distinction of Galen by which you may defend purgation made at the beginning and that made afterward; never will you with Manardus evacuate crude juices which are not swelling at the beginning of a sickness. May his shade spare me if I confess what I believe to be true. For it ought not be suffered that some error should injure the already renascent medical art, which might easily occur on the authority of this man who is held by many to be great. I would have spared his name if I could have hoped that he himself would be able to emendate his book, for it is by this rule that I spare living men against whom I refuse to do battle.⁶

⁶ This virtuous declaration is hardly supported by his tract against Leonard Fuchs published in the previous year.

There remains the contest with the Arabs in which many others have been provoked; whether tenuous humors require preparation for expulsion. In this matter also we are compelled to descend [into the arena], and employing new stratagems, we shall draw our forces together to fight the enemy. Therefore, first in the line as leader Avicenna steps forth, who in the first *Fen* of the fourth book, second tractate, chapter 7, says, "There is digestion of the choleric humor so that having been converted from subtlety, it becomes thick, and it is cold water that does this." If the troops of the Arabs do not attack us by other and stronger means we shall easily repel this feeble thrust, calling forth the forces of Aristotle and of Galen who are already gathered at the defences. Although according to the barbarians cold water digests, they do not employ it for concoction nor for digestion. And at the end of *De ratione victus*, I, Galen affirms that by its refrigeration it renders humors thick and densens tumors so that it is more difficult to evacuate or to digest them. He says the same in the *Methodus medendi*, IX, where he treats of the inconveniences of cold waters. Also elsewhere and throughout he writes that tumors become scirrhus from cold, and he forbids the use of cold drinks before the signs of concoction. For according to Galen, the purpose of water is to alter the quality and reduce the fervor or sharpness of the humors, and in *De ratione victus*, IV; he teaches one of two methods of treating *causon*,⁷ that is, by evacuation and extinction of the bilious humors, and there he attempts extinction by the use of cold drinks. The same words are in Paul, II, 29. Hence it happens that a cold drink evacuates the humors *per accidens*, because the expulsive faculty prevails over the extinguished material and expels it. But if Galen employs a cold drink after the signs of concoction, how can Avicenna employ that for aiding

⁷ *Causon* was the ardent fever of Hippocrates.

concoction or digestion? Nor will he find a defence in a pretended abuse of the word "digestion." For whatever is the use of the word in Arabic, we shall demonstrate that he does not know the natural faculties. Also, it is erroneous to recommend such digestives of bile in that way. First, because they are not suitable before the signs of concoction. Second, they are not suitable for a thick, obstructing bile. Third, because cold drinks are employed by Galen in fully developed tertians, for there is a more suitable remedy and better suited for the stronger attacks of fevers. Fourth, because in order that it may be prepared for purgation, it should not, as we have shown, be thickened. Fifth, even if it were always suited to the bilious humors, yet it is not a digestive protection which would prepare the material for other purgings by drugs since a cold drink, like a final defence, eliminates the bile *per accidens* and requires that the material be previously prepared.

Then other forces of the leader advance who, with Rhazes defeated and fleeing, oppose to us the digestion of bilious humors. For Rhazes the Carthaginian, in his *Continens*, XVI, seems unaware of the digestive faculty, yet he feels with great certainty that the bilious and tenuous juices must be purged in the beginning without any preparation through thickening. Galen had taught this before in the book *Quos oporteat purgare* where he wrote as follows, "For in the beginning of a sickness you will evacuate the serous and tenuous juices, but you will await concoction of the thick and viscous, of which sort are pituita and black bile." The same words in Oribasius "To Eustadius," I, chapter "De catharticis," which is chapter 16, and in Aetius, III, 23. Also in *De praedictionibus*, III, Galen says, "often it has been said that hotter and more tenuous humors are best prepared for excretion." Likewise, *Aphorismi*, I, 24, where he says that the humors especially prepared for flux are tenuous. Also

Aphorismi, II, 9, where he recommends that purgation correctly follows the tenuous. And in *Methodus medendi*, VII, he then eliminates the bile and sends ahead things to comminute the stickiness of the pituita. In addition, the reason why in fully developed tertians we grant a bath more readily than in the others is that the bile on account of tenuosity is more easily filtered out through the skin. Nor do these things contradict our aphorism which prohibits the evacuation of crude humors; for if the bile is perfected there is nothing of crudity in it, nor can there be concoction. If they are serous and tenuous humors, having some crudity, the aphorism is still not opposed because they incline more toward the extreme of turgidity than toward the other extreme of crudity. For they are tenuous and easily mobile.

Now we must reply to the arguments of Avicenna which we present *verbatim*. "You will not pay heed," he says, "to the man—meaning Rhazes—who believed that the intention in digesting is to subtilize, and that because the hot humor is subtle it is not necessary that it be subtilized. For the matter is not as he said; indeed, the intention in digestion is to equalize the substance of the material so that it may be prepared for easy expulsion. And the subtle having been resolved, and the viscous adhering, it is not prepared; indeed, it is necessary that the subtle be thickened, and the thick subtilized and the viscous broken up." This is the first argument; a second follows. "And if that man Rhazes may not have heard in the discourse of the ancients anything concerning digestion of the tenuous, yet because he has heard of digestion of the thick and viscous, he ought to know the former through the latter." O how prettily he concludes, indeed, condemning himself by conceding that it is not to be read in the discourse of the ancients. A third argument, "And because it was not necessary that he consider and say why in the beginnings

of acute fevers urines do not have sediment and that those which occur thereafter do, for laudable sediment is nothing except a humor causing sickness which already has been digested." This is what he says. But you, I may say incidentally, have a care lest this sediment deceive you, for as in the case of pus, hypostasis cannot occur from a fully developed or a putrid humor. But both occur in unconcocted juice which when it is unable to achieve assimilation, the substance seeks similarity of color. Hence it happens that if there is no concoction there is no sediment in the urine, and if the concoction is thoroughly perfected, as in the healthy who employ proper regimen of diet, also there is almost no hypostasis because the whole aliment is perfectly assimilated, nor does any of it degenerate into pus or dross. Whence that dross indicates perfection of concoction in sicknesses, yet if you consider the whole question there is no complete coction of the material from which hypostasis occurs, just as the material passing into pus is not so perfectly concocted as that which is assimilated. For this reason in children and gluttons more copious sediment appears than in those who enjoy a perfect diet and assimilate perfectly whatever is required, just as urine has more sediment at the time of the concoction of the blood than afterward, in *De crisibus*, I, 12. Furthermore, however it may be, the copious sediment is the result of a strong force, for much of the aliment is dominated by that which segregates much hypostasis; even if that itself is not perfectly assimilated, but is a kind of crude part of true aliment, as Galen says in *De natura humana*, com. 2, and at the end of *De praedictionibus*, I. And so you might ineptly believe that a putrefied humor through concoction comes into hypostasis, but the nature turns back the putrid and, seeking to concoct the crude humor which had to be putrefied, generates that dross in the manner of pus. The material, all of which is putrefied,

having been consumed by febrile heat, is otherwise digested as we shall say at the end of this discourse. I say these things incidentally, but you will find their proofs above.

I now return to Avicenna of whom this is the final argument: "The nature ought to cause a crisis in the beginnings of sicknesses and expel the material if it has been prepared when it was tenuous. Therefore when the nature does not do this we must not attempt it by the art, but await the thickening of the bilious humor." Finally, as if singing in triumph, the leader Avicenna adds: "And it would have been better for that man Rhazes if he had held a better opinion of men, such as Galen and Hippocrates, who were among those who wrote about this matter, and if he had carefully given his attention to them." Immortal God, what an attentive auditor of Hippocrates and Galen does the great Avicenna display himself to be, he who, you may gather from these things, was never versed in the writings of Galen. But we shall overthrow his four arguments. The first is the rule requiring that what is subtle be thickened. We concede that in true concoction the thickening occurs, but the preparation for expulsion is far otherwise; nor do we seek assimilation to the nature in it, but as much as possible to lead the material away from similarity so that it may more easily be expelled, and what is to be extenuated must not be thickened. But he says that the subtle humors are overcome by the parts unless they are thickened. We with equal facility shall say that they are eliminated and that the cause will be by the same subtlety, and by exit as well as by ingress; that if after the bile has been overcome it is thickened and causes obstructions, we shall extenuate and then we shall cleanse it away, never thickening in accordance with Avicenna.

In the second argument it now appears that a com-

plexion of that sort is of no importance; in preparation for purgation the thick will be extenuated, and therefore the tenuous will be thickened. Moreover let us see whether even among the ancients there was discussion regarding the elimination from the body of thickened, subtle material. For you will very often find this in Galen, and in *De simplicium medicamentorum facultatibus*, I, 24, he wrote as follows: "What is clearly tenuous, that fleeing the actions of medicaments will slip away and be fixed in a part so that like that which is thick it can by no means be driven backward." And in *De locis affectis*, IV, 9, he says, "It can happen in two ways so that in violent coughing one expectorates a little; some are seen to do this because of a tenuous humor. A tenuous humor, when it has been brought up, flows back during the intervals between coughs." Almost the same words occur in *De epidemias*, I, near the end of the first section; in *De ratione victus*, III; *De crisibus*, II, 10, and where he teaches that in concoction a medium thickness is acquired and then the juices are more easily eliminated. By this argument in *De compositione medicamentorum secundum locos*, VII, he recalls the cough confections of Andromachus which thicken the fluxions of the juices. Moreover, Hippocrates and Galen teach in innumerable places that tenuosity is always a sign of crudity and that thickness is prepared by concoction and is then more easily eliminated. One might say that Avicenna, relying on these authorities, ought not be condemned rashly. But a reply is at hand if one is able to discern likes from unlikes. For certain of the things by which evacuation is defended, evacuate by attraction, such as cathartics; others by expulsion, such as those astringents for the tumors and the air itself expelled during coughing. The first action is natural attraction, the second, a kind of violent expulsion; tenuous humors are the best prepared for the first elimin-

ation which our discourse considers, that is, through purgation. In violent repulsion which occurs in the beginning of phlegmons, tenuous humors are unable to be expelled in a mass, since slipping back something remains fallen upon the part, as said in chapter 24. Also in coughing, when the sputum is expelled upward by the breath by a kind of artifice, the tenuous humors flow back whence it occurs that they are expelled with more difficulty than after acquiring medium thickness. Now it is clear from these things that what Avicenna contends about purgative pharmacy for bilious juices is not proved. But shall we say that bilious humors are concocted by those confections of Andromachus? for they become thicker just as in the concoction of the nature. I reply that Andromachus composed cold narcotics for inducing sleep and extinguishing the sharpness of bilious fluxion. There is no concoction from them, but like cold water they render the humors concreted and provoke evacuation. For the humors having been extinguished and having achieved a certain thickness are expelled more easily in a mass. Nevertheless, this thickness is different from the thickness of concoction. For this is a kind of concretion from cold, and in concoction there is true thickness which Aristotle distinguishes from concretion.

There remains to be explained what has been adduced from Hippocrates and Galen, that tenuosity is a sign of crudity. For that tenuosity which is the indication of imperfect concoction and prohibits evacuation is not tenuosity of a humor which must be eliminated, but indicates excrement which must be eliminated. We speak of the elimination of the humor itself which apart from the argument of concoction has a special tenuosity from its nature, like bile. For the tenuosity of urine prohibiting evacuation is tenuosity *per accidens*, less than is customary in that kind of excrement, and it impedes purgation. Natural

tenuosity of the humor or of excrement remaining within, which Avicenna discusses, in no way impedes purgation. And so the siege weapons of the leader do not touch our citadel, nor do such arguments concern anything which he may do in the matter. Nor do his two other arguments prove anything, nor does he himself understand the argument by which crudity of urines appears in the beginning of fevers, so that neither crisis occurs nor are purges permissible, for it is not on account of the crudity of bile that it occurs. No less than Avicenna do some recent persons blind themselves, who, although they desire to avoid his error, have fallen into it when they say that in no bilious sicknesses must any preparation or concoction be awaited, but that the material is always cooked and prepared. Their error is no less harmful than that of Avicenna. Nor do they explain how it occurs that crude urines appear in the beginning of those diseases, and why if the material has been cooked and prepared that the nature does not cause a crisis. Also it is false that all bilious humors, as they say, are turgid, since you may find them fixed and obstructive. Therefore we have another reason drawn from the argument of our aphorism by which we shall not rashly agree to purgation even in bilious sicknesses and upon the urines appearing crude. Yet we shall not therefore confess that bile must be concocted or thickened, but we shall say it must be awaited so that after the concoction of the venous sort the nature secretes it. Therefore let us say that two causes prohibit purgation even in bilious diseases. First, because in that bilious humor which causes obstruction some thickness or stickiness is underlying—but not the thickenings of Avicenna—which requires the use of things which extenuate and comminute before they evacuate. If something crude is mixed with such a crude humor, much the less must it be evacuated, nor can a crisis occur until it has been cooked. Second, we

say that if it could happen so that that whole humor were perfected bile, tenuous and causing no obstruction but putrefying for another reason, it would increase the fever—for putrefaction would occur through no single obstruction, in *De inaequali intemperie* and *De differentiis febrium*, II, 12—and as yet would be crudity in the beginning of the disease, not because the fully developed humor causing the disease is crude but because it mixed itself with a venous kind of humor, and because the concoction of the stomach and the liver is impeded by the bursting forth of fever, whence result crude urines and the droppings of the bowel. Thus that crudity of the urine arises in the beginning of disease rather from this concoction of the liver and veins than from the crudity of the obstructing humor, which otherwise fixed in a part does not infect the urines. Hence often and properly [Bernard of] Gordon says that physicians are deceived in quartans. For when a sick person taking a little nourishment concocts well by reason of rest and sleep, the urine will appear cooked because of the good concoction of the aliment in the venous sort, although the sickness or the humor obstructing the spleen is crude. Therefore when much crudity exists in the veins, this crudity is indicated in the urines, and even if the disease is bilious in the beginning, it is not permitted to employ attracting drugs except with much premeditation as has been said. But from this Avicenna does not conclude that bile must be thickened in order that it may be prepared for purgation.

I judge this to be enough about Avicenna and that the aphorism will have been fully explained when I have asked this final question: When does Hippocrates desire us to put our confidence in purgation? for he seems never to permit it. He does not permit it before concoction; elsewhere he forbids it afterward. For concoction occurs more during fever, but when diseases occur and increase, he says

it is better to have rest. This was expressed before in the words of Galen, either in the beginning there must be purgation or concoction must be awaited. In former times in the beginning of sickness there was more evacuation by venesection, now there is more frequent use of purgation by approved medicaments. So that I may more fully answer this question, I shall consider the times of purgations and how often it is permitted to medicate in the beginning of sicknesses.

First, as Galen says in the book *De totius morbi temporibus*, it is preferable to eliminate by the bowel in the beginning, by a suppository, clyster or a gentle drug, so that the intestines are relieved of the burden of excrements and rendered better prepared for the elimination of other juices. This slight inanition is useful for greater things, for if any noxious humor is about, it is also eliminated, and those more common passages having been opened, very often as a consequence something is eliminated from the superior parts, as in *De compositione medicamentorum secundum locos*, II, and *Methodus medendi*, XII, where Galen treats of the clyster which frequently eliminates from the mesentery and internal veins of the liver.

Second, in the beginning it will be permitted to provoke vomiting when there is a repletion of crudity in the stomach or when the humors flow together there.

Third, [elimination is permissible] when the humors verge to the lower parts so that they wish to break forth there, or when the intestines murmur or there is uneasiness under the praecordia, heaviness of the knees or pain of the loins; for the movement of the nature must be followed, for in a certain way it is now turgid.

Fourth, just as in the case of the turgid humor, so then you may eliminate the tenuous, pestilential and finally others which approach more to the turgid than to the

crude. But because for the most part the humors do not truly swell, these things are rarely done and only with much premeditation, as Hippocrates, Galen and Celsus teach, and never with fever present. However we, having obtained more benign drugs, do it more boldly. Nor does Celsus oppose us, he who himself orders foods and drinks which at the same time nourish and mollify the belly. However, he does not permit this to be done very often, III, 4, for sick men are weakened by too frequent bowel movements. And taking advantage of this opportunity at the beginning of sicknesses, they are also able to take food and drink for the sake of controlling the bowel, as we shall mention. For complete purgation the signs of concoction must be awaited, but you will not await perfect concoction such as there is during fever. For already there will have been made by the nature a kind of secretion of the material to be expelled since you will see something secreted in urines. And the urine will appear more dominated than before, and in some degree it will indicate the material dominated within, which may be purged more in sicknesses of short duration. Yet one must beware lest by purgation you recall the nature which is setting in motion sweats or urines or verging elsewhere, or by too much agitation that you impede future concoction. In a quartan Galen does not purge before the fever sets in. For the longer the sickness the more perfect the concoction which must be awaited since the juices are thick and tenacious. But he purges more often during the fever which in a quartan is of long duration. Therefore before the signs of perfected concoction it is permitted to purge in other diseases since the nature usually causes a crisis, upon the appearance of only a little cloud or more color in the urine—to which Aetius refers in V, 28, and Galen, *De crisibus*, I, 12—the more so because when the most perfect concoction has been made hypostasis does not always

appear, especially in those who employ a light diet during the summer and during work, *De crisibus*, I, 12, and *Aphorismi*, I, 14. These things have been said in the discussion of other fevers and of the quartan during the fever. Hippocrates considers that there must be rest in other fevers while the fever is present. For then, says Galen, if all things have been properly done from the beginning and there is evacuation in the beginning, purgation is superfluous, because the nature itself suffices, as well as because it must not be further troubled since it has been harassed enough especially during the fever of an increasing and acute disease. If the material is redundant and the nature acts very slowly, the defect must be made good by medication, as in the book *Quos oporteat purgare*, and the commentary on our aphorism and the two preceding. Finally with the disease waning, and if you see that the nature has not purged sufficiently, you may purge with safety; and with the end of the disease you will eliminate the remainder lest it be recurrent. For these reasons it is seen that another case must be added in which purgation is permitted in the beginning and when there is a genuine humor from which no concoction is to be expected. But if the humor is tenuous it has already been comprised in those above, but if thick it will not be said that it must be eliminated in the beginning because first it must be extenuated and comminuted and coction of the disease awaited. The sum of the whole thing is in this, that it may be permitted in the beginning of each disease to purge by that drug of which the attractive force does not touch the liver. For the crudity is of the primary veins which are especially opposed to drugs, and this reason forbade purgations more among the ancients who employed more powerful drugs than among us employing the so-called approved medicines.

Certain things must now be opposed to the aphorism so

that all ambiguity may be removed. First, because there is an inept exception in regard to turgid humors, since you may not in the beginning eliminate the turgid if crudity has arisen, for the crude impede by obstructing the passages. I reply that crudities which arise in the beginning are not entirely the same as those properly called crude which obstruct the passages because of crudity. For they in the beginning of diseases, especially the bilious in which the humors are turgid, are not so thick. But in others crudity can impede so that bad symptoms more swiftly infect man than any juice may be eliminated by a drug. Whence, not improperly, among the ancients the strong purges were formidable. But today they are not dreaded because of approved medicines, and because of these the aphorism is partly false. That they may harm less, so they purge less those who are affected and who require strong drugs. For the argument of the aphorism remains unvanquished, so that whatever drug you may employ, if a thick humor is the obstacle, or the drug attracts none of it or with it attracting and the humor resisting, bad symptoms arise.

Second, a place in the compendium of Oribasius seems to be opposed to the aphorism: "Crude humors before they generate diseases must be evacuated with caution but in those who are already feverish, not at all." Although it is sometimes permissible to purge crude things in the healthy, never should it be done in the feverish. But we shall forbid the purgation of the crude also in the healthy in accordance with our aphorism and the precept of Galen, *De sanitate tuenda*, IV. For Oribasius, whom you will hear cited constantly throughout, realized that the juices must be evacuated cautiously through venesection, for he wrote this opinion in the chapter on venesection, which is chapter 7 of the first book "To Eustadius." Galen taught this—from whom Oribasius received it—in his

book *De missione sanguinis*, where he says, "Crude juices abound before the disease invades and you will evacuate with caution, but as I have advised before, not at all when fever corrupts." He had warned before, from fear of syncope, that a vein must not be opened in those feverish from crudity and indisposition of the mouth of the stomach, and he writes the same in the *Methodus medendi*, XII. For the indication of bodily strength opposes this therapy. He explains what is to be evacuated cautiously, teaching that a slight withdrawal of blood may be sought in conjunction with the use of things which extenuate. In this case we readily concede that purgation is not to be employed in the feverish since Galen does not admit it in the healthy because of the bad symptoms which follow the purgation of the crudities.

Finally, there remains one concern by which it appears that in fevers there is no opportunity for producing concoction by medicaments. For on the witness of Galen, *De differentiis febrium*, II, 5, 13, 16, he evacuates in paroxysms of fevers and discusses what has been putrefied and consumed. Whence it seems that nothing remains which ought to be eliminated by drugs after the increase of fever. You will see many confused by this argument, who do not understand what must be purged nor whence comes that copious material which the nature expels in abundance in crises; for if in individual increases of fever the whole of it were eliminated [at one time], nothing would remain for the crisis. Therefore it must be understood that first the crude material obstructs the way, and is not removed in paroxysms but remains in some part and there is concocted during the whole course of the disease up to the crisis, according to our aphorism. Furthermore, by reason of obstruction or bad disposition in some part, the materials putrefy, arouse a paroxysm, and are agitated by a kind of ebullition through the body. Such are removed

in the increases of fever, which were the containing cause of the increases. For thus they are produced from putridity and burning, and are extenuated, even thick materials, so that burned like fat they are dissolved into soot or smoke or are expelled with other excrements. This conjoined cause having been wholly removed, a putrid fever cannot advance further and then the paroxysm ends in recovered health. Where there is putridity in pituitous humors, some of the putrefied excrement also remains in the affected part, the chapters mentioned, 16 and the end of the 17th. For this reason, in quotidian fevers there is no true intermission because the pituita is not completely burned up. From this excrement of pus, or from the disposition of the part, and from other putrefied materials flowing thither, the following paroxysm occurs more swiftly or slowly according to the number and velocity of the humors flowing toward the dross; also longer or shorter, according to the quantity and quality of the humor, the strength of the patient and the disposition of the body, *De differentiis febrium*, II, 3. Now if the nature properly controls those poorly cooked and semi-putrid juices which as they flow together are swiftly corrupted, it overcomes and concocts them to prevent their flowing together; similarly, if it removes excrement causing obstruction or decocts the crude, the antecedent cause of the following increases in fever will have been removed. Moreover, in this way the nature will produce the crisis from the antecedent materials. First, through the adroitness of the nature which by concoction preserves the putridity, the blood can be saved from contagion and will remain healthy. Second, from the remainder of the antecedent material now putrescent, the nature through concoction will effect something purulent like pus, which is expelled by the crisis. Third, the nature by concoction separates out pure excrement or fully developed humor and then

expels it, and we may attract it; and if there is something of putridity either of its dross or ashes, it will remain and it is expelled through the crisis without any concoction, just as occurred in the earlier individual increases of fever. This is the triple function of the nature in crisis, toward pure aliment, semi-putrid and excrement. Before the crisis the nature begins to dominate and partly to overcome the materials in the body when it seeks to make the juices similar to itself; from semi-putrid material in the form of the concoction of humors it generates something purulent, although not so putrefied as those things which arouse paroxysms. For those which have been putrefied depart entirely from the method of concoction, and in this respect the skill of the nature is taken over by fire. According to the method of this concoction the urine begins to have sediment which is nothing other than purulent dross, and thus it will not be a part of the preternatural cause like pus, as Galen says at the end, *De praedictionibus*, I, which is the true distinction between pus and hypostasis. Therefore the semi-crude or purulent matter of this sort remaining in the body through maturation of disease in crisis, we call bilious, pituitous or atrabilious, according to the dominating humor. And thus we eliminate by purgative drugs such dross thus cooked of the bile or of another humor—this the more because from the whole concoction of the nature much bile like excrement of concoction is secreted through bilious diseases. Whence not only that purulent matter, which is less, but much bile secreted at that time is eliminated by drugs. Therefore to the objection we say that the conjoined causes perish with the individual increases in fever; and what is gathered from the antecedent causes produces the crisis and is eliminated by drugs. Now it is time to give consideration to syrups, so that with the goal of concoctions, preparations and purgations understood, we may inquire what the value of syrups is.

Concerning the composition and various uses of syrups
Fifth discourse

It is clear that syrups, whether they take their name from ὄποι “juices” and σύρω “to extract,” as if the juices were extracted; whether because they were brought from Syria; whether from that which Galen names σίατον, that is, *sapa* or a sweet decoction with honey; or whether one wishes their name to be derived from elsewhere, nevertheless they were named not by the Greeks but by the Arabs. The Arabs falsely believing that a syrup is a concoction name its special function as digestion. But correctly digestion is that which in Greek is διαφορήσις καὶ ἀνάδοσις, that is, dissipation through breathing and distribution. You may see the difference between concoction and digestion in the book *De inaequali intemperei* and in *De simplicium medicamentorum temperamentis*, V, 8. For tumors are digested when the material is diffused in the surrounding area but they are concocted for suppuration. Also we say that aliment is concocted first in the stomach and then digested, that is, distributed in the body. But this is enough of names. For we know that the name syrup was unheard of by the ancients although they employed *propomata*⁸ and sweet potions as well as other prepared potions to aid in purgation, and it was for this use that the Arabs composed syrups. Therefore, disregarding the name and considering the thing itself, as far as concerns the preparations we may say that according to Galen—and it is proper to do it thus because he is judge of the decision—the use of syrups will not be to concoct or to digest, but to extenuate and comminute. Indeed, the use of things extenuating and comminuting was always dear to Galen so that throughout he mentions them and wrote a special book about them.

⁸ *Propoma* was a draught usually containing wine and taken at the commencement of the meal.

There are many and various uses of syrups, and we shall mention three which have to do with the case. First, as an aid to concoctions we precede them with things which extenuate and comminute as we demonstrated in the third discourse; indeed, they themselves concoct, as we shall say. Second, for aiding concoctions in all parts Galen causes those things which extenuate and comminute to precede, even when the humors are turgid, *Aphorismi*, I, 24, and in the book *Quos oporteat purgare*. For they prepare the body, open the passages, dissipate obstructions and remove the thickness and stickiness of the humor, and, as we shall say, they eliminate something. Third, emission of blood also occurs more easily with this aid where there is abundance of crude humors, as Galen teaches in *De curandi ratione per venae sectionem*. For when a small quantity of blood has been extracted he then employs water-mead properly cooked with some drug which cuts up, such as hyssop, orégano, calaminthe, pennyroyal, or certainly with the water-mead he gives oxymel or oxyglycy, that is, raisin vinegar made from vinegar and sweet wine. Again, when the blood has been prepared, he withdraws some, for it is not safe to draw the crude copiously, nor yet can it be concocted unless it has been extenuated. And so the true syrups of Galen will be oxymel and mead, with comminuting herbs, oxymel against the viscous and mead against thick humors, the beginning of *De ratione victus*, III.

Some say that for this reason we must suppress the syrups or extracted juices of the Arabs. For Galen, unlike the Arabs, did not require such juices for that operation as the Arabs do, but herbs sufficed for him, and such as have been preserved for a full year because they dry and heat more strongly than the fresh. Likewise this true preparation for purgation, if we may believe Paul [of Aegineta], works better with a special regimen of diet

than do the formulae of the syrups. For in VII, 6, when he considers the preparation which ought to be made for purgations he teaches that man ought first to be nourished with a special diet extenuating and comminuting, before he is purged. Galen not otherwise in *Aphorismi*, II, 9, and the book *De victu extenuante*, saying that for this reason the syrups seem merely figments and useless. But we, that we may take up their defence, shall first reply that Galen, who wrote many books and practised medicine, often mentioned as easily prepared that decoction of dried herbs with oxymel and mead which we praise and call syrup, for in decoctions of that sort some juice is extracted from the herbs. Not only Galen, but also Asclepiades, Archigenes, Antonius Musa, Philagrius and other ancients expressly used the true juices of the herbs and from them made sweet potions which we call syrups, as we shall soon demonstrate. Furthermore, we shall not recommend dried herbs, sharper than is correct, as we do the pressed juices in which there is more of the integral virtue of the herbs than in their decoctions. Because if there is anything liquid in a fresh herb, that will be removed through decoction of the juice. As to the other matter asserted by Paul, we shall not deny that the use of syrups is comprised under the name *diaita*, since for Hippocrates and Galen the principal part of the regimen of diet in acute disease is oxymel, mead or ptisan. Also in the whole extenuating diet there are certain things which are comprised under the name of aliments, such as ptisan and mead; and there are certain medicaments such as oxymel and other things which can be concocted in mead, such as hyssop, dry vine-wood, etc., *Methodus medendi*, VIII, and it is to this type our syrups ought to be referred. And so the use of syrups may be recommended in that preparatory regimen of diet and employed according to the time of the sickness; for we accustom the nature to

endure without difficulty the unaccustomed time of the drug. Furthermore, when we are attempting to eliminate something by a medicinal potion we are preparing the way for a more powerful drug, and just as we accustom the nature to evacuations, so we shall demonstrate according to Galen, that this ought to be done in the case of vomiting, urines and all other evacuations. Also syrups may be recommended for their altering strength and their other functions. For the use of syrups is not confined only to extenuating and comminuting, but there are many other uses which I shall shortly relate lest anyone confuse them as the Arabs have done, and without discrimination call them all digestives. But first a few words must be said about their composition.

The Arabs make a distinction between juleps, syrups, apozemes, *robub* and *looch*. You will make a julep from sugar or some syrup by clarifying with four parts of water, but that of sugar with an infusion of flowers is more recommended. Roses or violets are thrust into boiling water with care being taken lest there be evaporation; then when they have been squeezed and cast out, the julep is made by straining and clarifying that water, which is called an infusion, adding sugar and bringing the mixture to a slight boil. You will use that julep which is fresh for cooling, humectifying and relieving thirst. Nor are juleps preserved unless one makes a complete concoction in the manner of syrups by a slight boiling and the addition of a larger amount of sugar. Juleps made with the aforesaid infusion are more approved than those made with water taken by distillation from toasted and roasted herbs, for the latter emit a kind of fiery odor and lose the strength of the herbs unless, as Manardus taught, they are placed in a double boiler so that the one containing the herbs is suspended over the other containing the boiling water so that it does not touch the water but is heated by receiving

the hot steam. The method of confecting syrups was from decoctions of honey, but now sugar is employed in place of honey and is mixed with those distilled waters.

The uses of them, as explained below, are various. Apozemes differ from syrups in that they are not so perfectly concocted nor preserved; there are those who call them slow syrups, but nevertheless the apozeme is nothing other than a decoction to which for the sake of flavor are added sweet condiments or even medicinal substances. *Robub* are juices thickened without sweetness in the sun or by fire. *Rob* is simply called must, but with an addition it is the same as *robub*, as *rob* of *Ribes*. *Robub* of that sort are not used because they do not please the taste unless you mix sweet things with them which is now done by many as in the case of *rob* of nuts which is a medicament of Galen. Their purpose is to constrict. *Looch* is not drunk but is retained in the mouth and sucked, and was employed by Galen by whom it was called ἔκλειμα (lozenge) and by us linctus [i.e., something to be licked]. It is used with honey for banishing coughs and other affections of the thorax. Those commonly prepared are *looche sanum* and *expertum*, *looche* of pine, of squill, and of poppy, according to the description of Mesue. For the manner of making *looche* of pine, see Hippocrates and Galen, *De ratione victus*, IV, com. 70, 79, *looche* of squill, last com., and elsewhere in *De compositione medicamentorum secundum locos*, VII.

But to return to the syrups. Usually they are compounded of almost as many handfuls of herbs, ounces of roots, seeds or flowers as there are pounds of water. The decoction is reduced to about half the [original] amount, but the roots may be cooked more and the flowers much less, and also when syrups are to be made from the juices they are first cooked alone. That which remains decocted of the waters or juices is strained and is clarified with

white of egg; then it is mixed with an equal weight of skimmed honey or of sugar, sometimes less or sometimes more according to the bitterness of the liquid and the taste of the patient. When all this has been mixed by a slight boiling it is again strained and finally completely cooked to a stickiness and viscosity and the syrup is made; if it is only decocted a little it will be called an apozeme. Furthermore they are made aromatic by the addition of very fine powders of two drachms' weight for each pound. The dose is one and a half or two ounces with either twice or thrice that amount of water, so that the whole amount is almost six ounces. As much of the apozeme is taken without water. I recommend the latter more than the syrups since in them the strength of the herbs has been exhausted because of age and too much concoction, but with herbs lacking in the winter and since then apozemes may not be made, we are compelled to rely on syrups for the whole year.

Galen did not neglect this kind of compound, and in *De compositione medicamentorum secundum locos*, VI, he compounded with honey various medicaments such as the juices of nuts, of mulberries, pomegranates and quinces. These compounds may be enumerated among the *looch* or *robub* rather than among syrups; nevertheless from the purpose of their composition you may also place them among the syrups. For he says in the beginning of the book: "These juices, if they are not cooked, rapidly become corrupted unless you mix the raw ones with honey; so that in the composition of the medicaments the juices must be regarded as cooked with honey, and thus they are prepared so that they may be used during the whole year and not only at that time when the juices are extracted." Galen offers another use of this composition because not only does the honey serve as a preservative, but also in syrups it aids by its own quality in cleansing

and moving the bowel, and by its sweetness it soothes the nature. Elsewhere and often compositions are made by Galen from juices and honey, as in the book *De compositione medicamentorum secundum locos*, which are easy to prepare. Would that we had Galen's book *De compositione medicamentorum purgantium* which he mentions in the beginning of the book *De compositione medicamentorum secundum locos*. For the ancients may not have spoken of syrups but of other things similar to them such as *propomata* and sweet potions. Whence in Paul, VII, there is a whole chapter on sweet and useful potions and *propomata*. Indeed, the *propomata* may be called *prepotiones*, and to these kinds must be referred the composition of juleps and of syrups so that the *hydrorosatum* of Paul is really syrup of roses. Nor is his *hydromelon* anything other than syrup of citrons, nor the composition of pomegranate wine other than syrup of pomegranates. Moreover, his *omphacomel* is syrup of the unripe grape; *myrtites*, syrup of myrtle-berries. You will find almost similar potions in the fifth book of Dioscorides. Also Oribasius in the fourth book "To Eustadius" wrote a whole chapter on potions which are employed in fevers, and in chapter 39 he mentions sweet, cooling, comminuting and astringent potions made from honey, water, oil and fruit juices. Also in Aetius we read a special chapter "On sweetness and potions customary in fevers, from Philagrius." Whence our use of syrups and *prepotiones* in fevers will be approved. These are the words of Philagrius: "A sweet potion has a double use. First, because the nature by reason of pleasure gladly accepts it and thence reheated and, as it were, revived, it arouses its languid actions which had been worn out from the attacks of the disease. Second, because that potion resists the sickness in two ways, by oppressing its force by contrary qualities and by arousing the animal forces so that it easily

bears the violent attack of the disease." Therefore our syrups have been recommended because they contain the uses of sweet potions and two ends for which they have been prescribed by Philagrius, reheating of the natural forces and alteration of the disease. Our syrups possess both uses. Also they possess those qualities which the extenuating and comminuting substances of Galen possess and many others such as those controlling the bowel, constricting, concocting, diuretic controls, all of which we comprise in various sweet potions and under the name of syrup. No one can disprove these uses since we take our information from Galen, and we add the sweetness of honey or sugar in those proportions mentioned by him and by Philagrius, for the preservation of the medicament, the pleasantness of taste, the re-creation of the nature and the special virtues of honey and sugar. There remains only to classify their special uses and accommodate them to the individual types of fevers.

Therefore the first use of syrups will be to concoct; I say first, because it is from this that digestive syrups have taken their name since they may do nothing less than to concoct. The second use is to alter the disease by a contrary quality; the third, to extenuate and to comminute. The fourth will be as diuretics. The fifth, that of controlling the bowel. The sixth, of binding it. The seventh, of strengthening and invigorating.

First, syrups can be prepared for aiding concoction, as from Cydonian sugar with pepper, from mint, from rinds of citron with the addition of coriander, saffron, nard, cinnamon and other fragrant things, for which see *De compositione medicamentorum secundum locos*, VIII. Nevertheless syrups are of no value for that purpose unless the part has been affected; otherwise sleep, rest, frictions, baths, foods and drinks slightly heated are sufficient.

If anyone wishes to confect syrups from the slightly

heated potions he will then be able to employ not only foods but also drugs. Whence Celsus says that the ancients by the addition of certain drugs were accustomed to achieve concoction because they had great fear of crudity. Nor ought syrups to be condemned as if the aforesaid guardians were enough to assist concoction, for if there is a crude disposition in some part medicaments will be best for it, as perhaps the *arteriace diacodion* of Andromachus, *De compositione medicamentorum secundum locos*, VII. Moreover, there is no slight concocting force for all cold ailments in nard, says Galen, *ibidem*, IX, where he discusses colics. For nard aids concoction for three reasons: first, it extenuates; second, it increases heat; third, it constricts. For extenuation, as I said, prepares the way for concoction; heat causes concoction, constriction strengthens its force. And so such medicaments decocted in syrups will penetrate more readily and will be gently attracted by the nature for concoction of the affections of the parts. In fevers unless they are of long duration, we rarely use medicaments of that sort for aiding concoction, for in acute fever other things are more effective such as reduction of the diet and thus removal of the cause by which concoction has been hindered. Nevertheless, if on occasion concoction must be aided, we shall attempt it after the precaution of extenuation, as we said above, and as we shall display below by examples. Yet there ought to be regimen of diet for ease of concoction, good juices and humidity. For in all fever it is especially necessary to look to the concoction of foods, as Galen says in *Methodus medendi*, XI.

The second use which consists in altering seems to be the only one the family of Arabs was concerned with, for they always so applied their digestives that their quality was contrary to the quality of the harmful humors. We, however, in respect to this use of the altering, shall recom-

mend only those syrups which are employed for bilious fevers, nor that constantly, for they are not suited to the thicker and obstructing bile since then those syrups which comminute are more necessary than the cold altering ones, or those syrups which effect both at the same time, of which sort is vinegar with a julep of violets. In other bilious sicknesses, especially the fully developed tertian, a tenuous humor outside the vessels is more easily eliminated whether through the skin or the common channels, according to Galen in *De crisibus*, II: "In tertians the bile is strongly moved, and is disseminated through the separate parts of the body and by its driving force it is expurgated by itself." Hence it occurs that we are not so concerned with indication of evacuation as we are with the indication of alteration through cold and humectifying substances so that febrile heat and the acridity of bile may be extinguished. Also in a *causon*, alteration is required more than purgation unless—as Hippocrates says—in the very acute diseases the material becomes so turgid that you are compelled to medicate on the same day since the material is too unrestrained to be repressed by syrups. Another effective remedy for *causon* is an abundance of cold things during the heat of the fever and after the signs of concoction. A bath is more suitable in tertians because the material is outside the vessels and verges toward the skin, through which it is expelled more easily than in *causon*. The use of cooling and humectifying syrups is common to both, nor do we much fear that difficulty of concoction will follow their use. For it is safer to treat fever in time when it has remitted than that through the heat of fever *marasmus*⁹ or death should occur, the more so because we can use alteratives, more humid and less cold such as sweet root, orach and lettuce which do not impede con-

⁹ *Marasmus* resulted, normally from a hectic fever, when the natural moistures had been consumed.

coction through too much cold. But you will say that from those syrups taken in small quantity, heat is aroused more than it is extinguished, so that if you will employ a little cold water you will increase the heat and the water is turned into bile. According to this reason certain ones reject those syrups as if cold drinks would suffice for altering. To them I reply that they speak correctly of that water since we employ it in the greatest increases of fever solely for the extinction of the fire. In syrups, just as in the rest of the humid regimen of diet, we observe another thing, that is, to nourish by humid nutriment; to produce colder blood so that it may not become bile, to oppose the heat and dryness which insinuate themselves into the solid parts and to strengthen the solid parts. For these things water is unsuitable because it does not truly humectify the solid parts, according to the *Aphorisms*, IV, 13. In addition, it is not safe to give so large a potion of syrup as of water, as Galen says of oxymel, in *De ratione victus*, I, com. 43, III, com. 28. For water is altered swiftly, but the thicker syrups retain their temperament, nor are they turned into bile so easily. They act slowly outside [the time of] the paroxysm, the water suddenly in the paroxysm; they are used in moderate quantity, the water in copious; they are also used before the signs of concoction are indicated, the water after concoction. Also sometimes Hippocrates gives a very little water in the regimen of diet during the use of mead and oxymel, *De ratione victus*, III, com. 39, yet those syrups are preferred as appears from IV, com. 5. Therefore they understand the matter poorly who condemn cold syrups because water is drunk. Rather, experienced physicians affirm that cold syrups must also be administered before purgation because they strengthen the weak forces and because they destroy the acridity of the humor being eliminated, lest in transit it harm the neighboring parts with fiery heat. For you will

see sometimes that the sick are partially burned up if you eliminate an acrid humor without having first cooled it. Hippocrates and Galen are aware of this sort of danger, *De ratione victus*, III, com. 13, 14, IV, 109, yet for aiding purgation they never employ cold things. And so in this matter judgment is required lest cold things be completely condemned and lest rashly they always be permitted, on the advice of Galen who in acute and bilious diseases orders not cold drinks but extenuating and comminuting substances before purgation, *Aphorismi*, I, 24, and the book *Quos oporteat purgare*. By these alone he was accustomed to prepare the body, as in the said places and in the book *De morbo comitiali*, *Aphorismi*, II, 9, and *Methodus medendi*, XI. Indeed, he gave extenuating things simultaneously with the aforesaid medicament in *Quos oporteat purgare*, because the cold quality by itself impedes rather than aids the movement of the purgation; but the indication which has been taken from the bodily forces will persuade us to attend to those things, and the indication which is taken from the causes will forewarn us of unsuitable possibilities.

When therefore you fear the weakness of the nature and the acridity of the humor, you will employ the cold syrups according to the aforesaid indications, just as on the contrary you will constantly, with Hippocrates and Galen, order extenuating and comminuting things when you will be compelled to make the body fluid. Nor will one in my opinion ineptly employ each precaution, using first humid regimen of diet and cold syrups, if the febrile heat requires it; but if purgation is needed, employing water-mead with extenuating herbs since according to the conclusions of the ancients extenuating and comminuting things constantly precede purgation. But you may object that if the humors are sufficiently tenuous they do not require extenuating substances. Indeed, I confess that, but

I affirm that extenuating substances are not safely to be condemned, especially if you have employed cold syrups before, and likewise if it is not sufficiently clear whether or not the passages have been opened.

Therefore it is useful to employ extenuation and comminution, especially if the drug is of good quality, attracting from the liver and other remote parts; for by reason of these things the opening of the passages was of the greatest concern to the ancients, just as crudity of the primary veins was greatly feared. But for our physicians whose drugs scarcely reach the liver but eliminate materials from the belly, crudity is not so formidable nor the use of extenuating substances so frequent. You will see on each side reasons which must not be disregarded, and sometimes one may use cold substances, sometimes extenuating, sometimes both. The judgment in this will be up to the physician, if he will carefully note the strength of the drug, the quality of the humor to be eliminated and through what passages the elimination must be made. In this way I have always judged that precautions must be employed so that, preserving the conclusions of the ancients, we do not reject syrups. When this opinion of mine was asked, that incomparable preceptor of sounder medicine, Jacobus Sylvius, a man endowed with a sharp judgment and highly skilled in interpreting Galen, did not disapprove it.¹⁰

But someone will object that for Galen fever is last in the method of treatment, and that therefore cooling ought to be last of all. I reply that Galen in the general method, after the signs of concoction, uses a cold drink for the extinction of heat, and likewise after the evacuation of the

¹⁰ The implication here of a personal acquaintance with Sylvius does not necessarily mean that Servetus was studying medicine at this time in the medical school of the University of Paris. If that had been the case it is more likely that he would not have spoken in such impersonal fashion of Guinther of Andernach as he does farther on.

humors he treats what is left of the febrile heat like a hectic fever in the solid parts; and this is done by bath, cold potion and other refrigerants. The indication which urges us more readily to the use of cold syrups and the humid regimen of diet was taken from elsewhere, as I have already said, and Galen himself alters a tertian from the beginning by cold and humid things; and in *De ratione victus*, I, com. 43, orders cold oxymel to be given before concoction of the disease and bread dissolved in water; and in *Ad Glauconem*, I, also the ptisan is cold, and cold things combat the putridity, *Methodus medendi*, XI.

The third use of syrups for comminuting and attenuating has now been comprehended in the aforesaid. There remains only to show that the formulae of syrups for this matter were invented by the ancients. For in *De compositione medicamentorum secundum locos*, VIII, syrups for various affections of the liver are composed from the juices of chicory, dill, iris and other herbs by Antonius Musa and other early physicians, and there Galen recommends these syrups. In book IX are those composed by Archigenes from the juice of celandine with mead for jaundice arising from obstruction of the liver; this is a true composition of syrup. In the same place is that taken from Asclepiades, the juices of cynoglossum and teucrium for splenetic ailments. Of this kind are the syrups which are repurged through means of the sputa and mentioned in *Methodus medendi*, XIII, of which sort are the medium syrups of jujubes¹¹ and of licorice-root; the ptisans of Galen, broth and mead, which you will better call detergents. But more efficacious for Galen are the syrups of hyssop and horehound, and seed of nettle with mead, in which have been mixed some acrid herbs; of these he

¹¹ Jujubes, the *serica* of Galen; cold and humid, of slow digestion and conducive to phlegm.

mentions orégano, hyssop, calaminthe, pennyroyal, iris root of Illyrica, or oxymel of hore-hound which is a true syrup. You will collect others from Galen, *Simplicium medicamentorum*, V, 11-12, for purging the thorax, lungs, liver, spleen and kidneys.

The fourth use is that of diuretics, that of eliminating urines, and this is so common to Galen that he always uses them in tertian, quotidian and quartan fevers, and recommends them in visceral obstructions, *Ad Glauconem*, I. Nor is it difficult to compose sweet potions from the large supply of materials eliminating urines, so that from oxymel you will make a diuretic by adding the roots of fennel or of parsley. For diuretics differ from the comminuting and extenuating substances in only this, that they are more efficacious, acrid, hot and dry. I shall soon consider at what time these and all others ought to be used. For provoking menses you will compose syrups from catnip, pennyroyal, sabina, dittany, iris and so forth, *De curatione per venae sectionem* and *Simplicium medicamentorum*, V, 21.

The fifth use, that of moving the bowels, if we may believe Celsus, is to be preferred in fevers to all other drugs. "It is expedient," he says, "to compose foods and potions which at the same time nourish and soothe the belly." For he always condemns other purgative drugs in fevers, II, 12. And Damascenus in the aphorism considers it best if you can make food from temperate medicine. If in the beginning of the sickness the bowel must be moved it is safer to employ sweet potions of this sort, which we shall describe for moving the bowel in each of the fevers, than by other drugs harmful to it and which may destroy the nature already weakened by the fever, as Aetius noted also, III, 57. Galen does not differ in *Aphorismi*, I, 24, where by reason of fever he considers all drugs of that sort as noxious. I understand fever as continuous, for when

there is rest there is no fever and then it is permitted to give a drug. So far am I from agreement with those who recommend purgations without any syrups at all, that rather I would dispense with their purgations and use only sweet potions. I have read in Galen that he purges only intermittent fevers, and I consider that he feared to do this in the continuous, the more so because, if we believe [Alexander of] Tralles, the material is thicker in the continuous than in the intermittent fevers and thus purgation is more difficult.

If you object that approved drugs are not thus to be feared, I shall praise them and put them into my sweet potions. For in that manner in which they are commonly prepared they are disliked by the sick, and the nature does not accept them willingly so that they may suitably perform those functions which we related are performed by sweet potions. There is another reason why I believe that these *propomata* or sweet potions ought to have no little use. For if a stronger drug is to follow it is of no little value to have discovered whether or not the patient's bowel is resistant. Likewise they are of value for provoking evacuation always at the same hour and to regularize the nature. For by means of nutrition defecation can be regularized, *De sanitate tuenda*, VI. Of this class and of the two preceding are those common potions generally evacuating through the bowel, sweats and urines, such as ptisan, mead and decoction of oxymel, apomel and parsley, which Galen uses against the putridity of fevers for cleansing, extenuating and evacuating, *Methodus medendi*, VIII, XI.

The sixth and seventh uses, for constriction and strengthening, seem not to require much of the syrups; nor is it the function of the sweet to constrict, even if you may find syrups composed for that purpose, as that of miva, or juice of quinces, of wormwood, of mint, etc. For the

nature is delighted by the taste of the sweet; when we mix the sweet with the astringent it is so that the nature may be revived by the sweet and strengthened by the astringent. Galen in *Methodus medendi*, VIII, employs the juice of quinces or a decoction of pears or of myrtle for the sake of pleasantness, and for repressing the flux of the belly. Moreover, in book VIII, syrup of poppy with water of violets is able to induce sleep; likewise for vomiting, as we shall soon say.

When these classes have been arranged it will not be amiss to add several syrups for individual kinds of fevers and other remedies without syrups, taken from Galen, so that one can employ a method for each [fever], and what order of use ought to be employed may be more fully understood. Galen, for whom the blood does not putrefy, has three general kinds of fevers, so that if we say bilious, pituitous and atrabilious, we may be considered to have mentioned them all.

First, in one diagnosed as a fully developed tertian, altering syrups are preferable because the bilious humor is evacuated easily and because no preparation is required. For according to the teaching of Galen, in this fever cooling and humectifying things are necessary since the indication always requires alteration more than evacuation. Therefore, if there is need, first a gentle drug having been employed or a gentle clyster without salt, and thereafter altering syrups, such as a simple water with the juice of pomegranates and a little sugar; vinegar-sugar, barley-water with the juice of some medicinal apple, or vinegar water with sugar. In summer a julep of violets or roses with cold water; simple vinegar syrup, syrup of the juice of gourd, or purslain with white sugar, not with brown sugar or honey which are hotter. Finally, decoctions of the juices of cold herbs. The four larger, cold seeds which are those of the cucumber, gourd, citron and melon; the

four smaller, of purslain, endive, escarole and lettuce, and all the acid fruits. Whey, juice of roses, of violets, the plum, tamarinds infused or decocted, juice of pomegranates, and the juice expressed from gourds, decocted with sugar, are at once alternative and laxative.

Galen approves of diuretic syrups composed from a decoction of dill and parsley in tertians when the fever is absent and concoction has already begun, for he says, "Urine ought to be provoked by potions in which are steeped parsley and dill," *Ad Glauconem*, I. And also in all the intermittent [fevers] and those with rigors it is helpful to administer sudorifics two hours before the onset, such as a decoction of calaminthe with 20 grains of castor, according to Aetius based on Dioscorides; 10 grains of parsley seed or of birthwort with wine, or a decoction of maidenhair mixed with a little dill; and especially this if you smear the skin with oil of sweet almonds or with some other moderately hot thing and rub gently with warm cloths. If the bile adheres tenaciously, or if the tertian has not been fully developed, you will add things which comminute with some humectifying liquid which will aid the humors to be eliminated from the dry parts of the body and alter and render the body fluid. Such is the julep of violets with honey against the pituita, and even better that clarified syrup of roses. You will use the oxymel of Galen because that is an acidulous syrup with honey; and also hops with spike, syrup of calaminthe with rose julep, Byzantine syrup with vinegar and the acidulous syrup of roots. Finally, Galen aided concoction with rest and hot fomentations for the praecordia, for which may also be used the broth of the ptisan with pepper, wine of hyssop and the *aromatites* [wine] of Dioscorides and syrup of mint.

In the quotidian it is better to use those things which cut up, and chiefly for the vitreous pituita, for which—

after a clyster of salt or another medicament—a genuine Galenical syrup of two ounces of oxymel with three or four ounces of decocted hyssop, and it will be more effective if the oxymel is compound, and still more if it is vinegar-squill or *looch* of squill. Also syrup of white horehound, or hore-hound is efficacious against a slow pituita. The common remedies are pennyroyal, calaminthe, rue and their syrups, and of the five roots, fennel, parsley, rock-parsley, asparagus and butcher's-broom; also other things which eliminate the urines. Those which at the same time cut up and control the bowel are honey of roses, syrups of lavender, hyssop, squill, cyclamen, or sowbread; decoctions of cabbage, nettle and *gallus decrepitus*. Here also as in a false tertian the concoction may be aided.

In the quartan Galen orders the black bile to be treated gently in the beginning so that after a mild drug we shall alter with humid things, sweet apples, grapes, sweet white wine, water of borage or bugloss, julep and syrup of violets, syrup of apples and other humid things, moderately warm or cold according to the various kinds of roasted bile. For such things soften, alter the dry dross and prepare gently. Then we shall cut up with salty things, mustard and medicament of the three peppers¹² and *diospolites*.

We shall remove obstructions of the spleen by syrups of capers, tamarind, spleenwort, squill and others, *Simplicum medicamentorum*, V, 11. Then according to Galen, concoction must be aided by frictions, baths and moderate walking; and also those detergent and comminuting substances aid concoction, *De sanitate tuenda*, VI. Also we shall provoke urines with a decoction of rue and dill in mead, which is a true composition of syrup. Finally there may be employed syrups which at the same time extenuate and loosen the bowel such as dodder of thyme, poly-

¹² The three peppers were black, white and *piper longum*.

pody and a fumatory of grass, or the same herbs with whey and a fumatory of grass or of hops.

This is the method of using syrups and of treating fevers from which order of treatment in retentive ailments Galen does not differ, *Methodus medendi*, XI. For the quantity of the blood having been diminished by venesection, the obstructions are removed by those things which cleanse, extenuate and cut up without apparent heat, and with the same procedures he evacuates putridity through sweats, urines and the bowel; afterwards he assists concoction and employs cold things. Beware that in which one may err, for in a quartan one may not comminute with vinegar, nor employ oxymel or syrups of vinegar, of which the Arabs teach the opposite. Also Galen says that vinegar controls the spleen, *De compositione medicamentorum secundum locos*, IX, *Methodus medendi*, XI, XIV, and *Simplicium medicamentorum*, V, for because it cuts up and extenuates the obstructing thickness, it is permissible there because the spleen is not affected by the fermentation [alteration]. But for those in whom atrabilious humors abound in the whole body, or who have a melancholy temperament, he says that vinegar is very inimical, *Simplicium medicamentorum*, I, 31. For the vinegar causes a fermentation and attracts and increases the melancholy, as Hippocrates says, *Regimen of diet*, III, and there Galen again says that vinegar is very inimical to the melancholy, and especially in women in whom it produces a lesion of the uterus. For this reason in quartans Galen never orders comminution with vinegar but with salty things, mustard and pepper, although in the treatment preceding and following he commends the use of oxymel for comminuting pituita and bile.

Therefore if anyone uses Byzantine syrup in atrabilious fevers, let him remove or diminish the vinegar. All these syrups you will prepare hot, except at the time of great

heat or thirst during the fever for then you may employ juleps with cold water. In the summer Hippocrates also employs cold oxymel and in the winter, hot, *De ratione victus*, I, com. 43. You will not employ it tepid, for the tepid dissolves the strength of the stomach, *Methodus medendi*, VII. For this reason we use the tepid to provoke vomiting. But for that purpose the formulae of syrups are not necessary even if syrup of vinegar, oxymel and hydro-mel may provoke vomiting, especially with cudweed; also for other reasons it is permitted to use tepid syrups, *De ratione victus*, III, com. 28, *Methodus medendi*, VII. You will note another thing, the use of astringent substances and of syrups strengthening the stomach after evacuation unless the symptoms compel us to aid the stomach first. Galen teaches all these things in *Ad Glauconem*, I. For if astringent things have been taken before evacuation the bad humors become more fixed; hence in a quotidian Galen strengthens the mouth of the stomach according to its state [i.e., of the fever]. You will do the same in a tertian in accordance with the affection of the liver; the special ailments of these organs, such as a phlegmon, require astringent things at any time more than in the fever alone, lest their vigor be lost. However, in the beginning of the fever you may in some manner foment with hot things. The spleen does not demand astringents equally at all times, but more after evacuation; whence in the beginning of a quartan Galen orders it to be treated gently and mitigated. Another thing which follows this ought not to be omitted, that is, the use of comminuting substances, especially in prolonged fevers, is not desirable immediately from the beginning but rather first some rest and relaxation so that the substances comminuting may penetrate better and eliminate the relaxed material. Galen held to this, ordering those things which comminute in quotidiants after the first days as he had done in quar-

tans and in false tertians. This is confirmed by another reason, for in sicknesses we comminute the bad humors so that we may evacuate them and also these things provoke urines and evacuate through the bowel and sweats so that as a consequence the material now cut up and extenuated is expelled as if it had been prepared. Whence by things which only cut up, and with a slight movement of the bowel or vomiting, you will with Galen cure many false fevers. And so when we comminute so that elimination may follow, this results for the thick material; properly then we shall not extenuate but employ relaxing substances with rest which prepare a way for the extenuation, just as the extenuation for the concoction. And also ardent fevers must in the beginning be treated mildly and gently, as Aetius says on the authority of Philumenus. And Galen in the beginning of fevers gives extenuating things for purgation of the turgid, *Aphorismi*, I, 24. To which it can be said that extenuating things extenuate not only humors but also our substance, and liquidate them by violent action, which is not suitable in the beginning lest we afflict more the nature already afflicted by the disease which has arisen and overthrow the forces which then will not be sufficient at the time of decision [crisis]; just as in the beginning we do not order a special regimen of diet in diseases of longer duration. But for material becoming turgid we employ purgation so that it may be purged without violence, as extenuating things also act without much violence when the humor is not so thick. Likewise, Galen employs extenuating things one time only, and only occasionally. Furthermore when the disease is acute, even if in the beginning we afflict the forces by purgation and things which cut up, there does not result such inconvenience from thick humors as in diseases of longer duration in which we attempt to preserve the natural vigor so that it will suffice at the time of decision;

the more so because in the beginning of a disease of long duration we are unable to obtain the desired end of extenuation, for we extenuate that we may eliminate or that good concoction may follow, which in diseases of long duration occurs after many days.

I judge that nothing is lacking to the completion of our discourse on syrups or purgative preparations and their various uses, unless someone requires that the syrups be related to the individual passages of the body. In this matter it must first be understood through what passages each part must be purged, which Galen describes in *Methodus medendi*, VII, XI, XIII and *Ad Glauconem*, II. For the stomach is purged by vomiting and defecation; the intestines, the cavities of the liver, and the spleen from the lower parts; the lobes of the liver, the kidneys, and the bladder and all the veins through the bowel if they are filled with much harmful juice, but if little, through the urines; the brain through the palate, nostrils and ears; the chest and lungs through the trachea. These attended to, preparation must be made corresponding to the individual evacuations, as Galen teaches in *Methodus medendi*, XI. For we shall prepare the way for those which must be eliminated through the bowel by stronger medicament, by mead and humid, fatty and sweet foods which lubricate the bowel; likewise, by clysters, suppositories and drugs taken by mouth such as cassia, manna and others. I said stronger medicament for preparation is required not for mild but for strong drugs. In like manner, we shall prepare for stronger vomiting and neglect the lesser, as by hot water, barley-water, mead, oxymel, oil and fresh figs taken in abundance. We shall attempt this with food because then vomiting is easier; then if necessary, without food. Also we shall humectify the body with much food and rest and we shall keep the hands and feet warm and also the parts around the mouth of the stomach. Then we shall

do other things which Hippocrates orders in the book *Regimen of diet of individuals*, and Paul, VII, 10, where he mentions various ways of preparing hellebore. And if anything is to be eliminated by wines you will prepare the way with light diuretics, for some are more acrid than others, and for this purpose you will employ more bland foods such as white wine and other tenuous things. Also diluted mead as well as beans decocted with the root of petroseline will expel the urines. What must be expelled by coughing and sputum you will aid in a similar way by humectifying the trachea and by a slight decoction of colt's-foot. For purgation of the brain we render fluid with water-basil and purge the passages which descend through the palate and nares.

Aetius in individual chapters of book III treats of the material for these local purgations, and Oribasius in book II "To Eustadius," so that from them syrups may easily be composed. But because one may properly judge that this is all in vain, it will be wiser to desist than to waste one's efforts and oil in copying formulae for syrups. There remains one matter for consideration respecting the spleen, for it is written in *Ad Glauconem*, II, that the intestines are purged by excretions from the lower parts, while both the spleen and the kidneys through the urines. I reply that Galen, *Methodus medendi*, XIII, clearly demonstrates that the spleen is purged not through the urines but through the lower parts; since there is no passage open from them into the kidneys, except what may regurgitate from the spleen into the kidneys, which might be strained out into the urines. Nor did Galen teach anything in opposition to this in *Ad Glauconem*. However, the interpreter punctuated the Greek codex poorly, of which the words are: "The intestines through lower excretions, just as the spleen. And the kidneys through the urines." For the [Greek] letter M begins the second sen-

tence "in the kidneys," and that very careful restorer of Galen and praiseworthy physician, Guinther of Andernach,¹³ when he lectured publicly at Paris on the Greek text of Galen, considered that this place ought to be emended.

A second matter for consideration which must not be overlooked is that regarding the accustoming of the nature to defecation, *De sanitate tuenda*, VI, and of which mention was made a little earlier; for through the use of purges the body may acquire a bad habit, as Galen teaches, *Aphorismi*, III, 15. Likewise, it ought to be accomplished with not one but various medicaments, as Galen teaches, *De sanitate tuenda*, V, so that the bowel ought to be loosened in turn by dog's-mercury, sea-cabbage, which is called soldanella, safflower, and turpentine. For, he says, if it becomes accustomed to only one, it will [in time] disregard it. But if in fevers you cause the bowel to move by so many, you will destroy its vigor before the nature becomes accustomed to one. In addition, the nature will not become accustomed to clysters but rather irritated by them, yet it has no memory of spontaneous excretions, as Paul says, I, 44. I reply that in the aphorism Galen spoke of the continual use of purgatives. Here we speak not thus of continual but of the occasional use of preparations for the movement of the bowel if there is indication for it. Nor do we speak here of habituation. For that results from much usage, and it is enough for us to have purged once in order to indicate the pathway for future medicament, lest the nature bear the unaccustomed thing with vexation, and at the unaccustomed time, and especially when the passage had not been open.

Here we might place an end to the whole discussion

¹³ In view of the personal recognition of Servetus which Guinther of Andernach expressed in 1539, the impersonal nature of the present remark suggests that there was as yet no acquaintance and so supports the claim that Servetus did not begin formal medical study in the university until 1538.

except that there is a controversy as to what ought to be done after purgation, which matter I judge it will not be amiss to treat briefly.

*What ought to be done after purgations
Sixth discourse*

After purgations and a little before eating, four or five hours after the taking of the medicament or after two, three or more bowel movements, the practitioners employ what is called by them a wash. They prepare a ptisan or a broth, insipid so that it may descend more rapidly and not be seized upon by the nature for aliment. They employ this precaution when the medicament used is of the third or fourth degree, for if it were weaker it would be unnecessary, the more so because it would act more slowly; and although prepared for washing and cleansing it would be compelled to descend too soon and its action would be lost. But when the medicament is more powerful there is greater necessity for the washing of the belly and intestines so that the remains of the medicament or of the sharp humors may be eliminated and the alteration being produced by heat and dryness halted. Also on the following day they wash with clysters for the same reason, especially if scammony has been taken, for Galen says, *Methodus medendi*, XII, that it harms the intestines. And particles of it usually remain in the folds of the lower intestine, insinuating themselves there and through irritation producing tenesmus. Thus after purgation the practitioners employ both opiates and confections for dissolving the remains of the material and for strengthening the parts; but for Hippocrates and Galen there was another purpose in the washing, *De ratione victus*, II, and *Quos oporteat purgare*. For they order that immediately after the medicament has been taken a ptisan be drunk so that the lesion at the mouth of the stomach may be removed. For

the mouth of the stomach taking something from the substance of the medicament is harmed and altered by its noxious quality, and the draught of ptisan relieves both conditions.

Will Hippocrates and Galen therefore condemn the practice of the moderns? It does not seem so to me. For they aid the belly and intestines in the same way as those others, the mouth of the stomach; indeed, our physicians aid both by one washing. For the lesion of the mouth of the stomach is not affected so vehemently before four hours, for with the drug they employ sweet smelling substances and others which are called correctives, such as mastic and tragacanth with the scammony. However, if there is doubt about the lesion, it is safer to attend to it immediately, especially when the mouth of the stomach is hot and dry; for in acute fevers the lesion is then serious, for Hippocrates spoke much of those from hot and dry drugs. Nor do the moderns dismiss this without aid, for after a washing of hot water they employ a cold and astringent juice such as that of the pomegranate or bitter grape. And afterward it appears that in the very best manner they attend to the lesion in the fundus of the stomach and of the intestines, arisen from the remainder of the medicament.

But you will say that Hippocrates and Galen prohibited a washing or detergent draught during purgation or after purgation had been begun. And they correctly prohibit it once the medicament is in operation but not when the action has ceased. And for the same reason they prohibit eating; therefore when eating is permitted so is washing. When a sufficient amount of time has passed in which the medicament can have exerted its power—for it remains in the stomach only four hours and then driven through the intestines it descends, attracting the humors—then the stomach may be washed. And such washing does not

impede excretion; indeed, it will assist it, although it will impede if it is employed too soon. And so I do not condemn the common practice but I believe a ptisan would be harmful if drunk immediately after a bland and benign medicament; for it is enough to impede vomiting to take a bite of apple or sugar or some other sweet thing or to swallow pure water or to wash the face and mouth.

After evacuation the part ought to be strengthened, according to the precept of Galen, *Simplicium medicamentorum*, VII, "de centaurio maiori" and throughout *De compositione medicamentorum secundum locos*, *Ad Glauconem*, II, and *Methodus medendi*, XIV.

And now that our discourse has progressed to this point, I might add the reason of the dosage or of the rule for medicaments, so different between the ancients and the moderns; except that it may be gathered from the use of the aforesaid draughts. Nor would I hesitate to employ a larger than usual dose of medicament if immediately a detergent and washing draught followed, since that compels the drug to descend swiftly and represses its strength and harmfulness. The ancients maintaining this procedure safely prescribed stronger drugs than we dare. But now it appears time to cease and to put an end to our little book.

The end

IV

THE DISCOURSE IN FAVOR OF ASTROLOGY (1538)

SERVETUS is recorded as having matriculated at the University of Paris, March 24, 1537/38, that is, the last day of the year 1537 under the calendar then in use. He was enrolled in the College of the Lombards where he studied mathematics and, in addition, pursued medical studies under Jacobus Sylvius, Jean Fernel and Guinther of Andernach, and although the last of these professors mentioned him in favorable terms in the following year, there is no evidence that Servetus ever received a medical degree. It was presumably at this time that he knew as a fellow-student Jean Perrell whom he was to meet again as personal physician to Archbishop Palmier and whom he mentions in the dedicatory letter to the second edition of the Ptolemy.

Servetus—then twenty-seven years of age—was probably a little older than the majority of the students and certainly he had had wider experience than most. Furthermore, his edition of Ptolemy, published in 1535, had gained him some recognition as a geographer, astronomer and mathematician, and he appears to have continued studies in these fields during the period from his arrival in Paris in 1536 until his matriculation in the university. Although it was contrary to university regulations—apparently somewhat laxly enforced at this time—Servetus, despite the lack of the master of arts degree, proceeded to give lectures on mathematics and astronomy. He appears to have been encouraged in this activity by Pierre Palmier, Archbishop of Vienne, who was then in Paris. Moreover,

any auditors' fees from these lectures were no doubt a welcome addition to Servetus' slender funds.

There seem to have been no difficulties until the lectures on astronomy strayed over the somewhat vague border area into the field of astrology and more particularly into the forbidden area of judicial astrology. There was then no sharp division between astronomy and astrology, and there were many eminent persons who were still confirmed believers in the value of the latter subject. So upright and eminent a theologian as Philip Melanchthon was a devotee of astrology and even of judicial astrology. Indeed, astrology still had some repute since it was held that the celestial bodies did have some influence upon terrestrial matters, such as tides and meteorological phenomena, and might even have influence upon the state of one's health; but judicial astrology was considered to be a sort of fortune-telling, playing upon the superstitions of the credulous and generally exposing them to all sorts of impostors. While astrology was sometimes looked upon as a crime, judicial astrology was regarded as a very serious offence. At this particular time the Paris medical faculty and especially its dean Jean Tagault were very conscious of the nature and harmfulness of judicial astrology since not long before they had brought into court, caused the condemnation and thereafter the expulsion from the medical profession of a certain Jean Thibault, a self-declared royal physician and an astrologer. Thibault, it may be added, was a friend of Servetus.

In February 1538 rumors began to reach the medical faculty that for some time Servetus had been lecturing on judicial astrology, and there seems also to be some likelihood that he was privately forecasting as a means of augmenting his funds. Thereafter the full story is made plain through official investigation and trial.

Although Servetus was warned of the possible consequences of his actions by some of the members of the

faculty, he refused to discontinue his lectures and, as he mentions in his account, he was as a result discomfited by the appearance of Tagault at one of his lectures. Tagault ordered him to obey the injunction of the faculty, but Servetus, angered and humiliated, prepared to support his case by a printed apology, again despite warnings which only led him to make violent threats against the dean. As a result, the Parlement of Paris, upon the petition of the medical faculty, forbade the publication and brought Servetus into court only to postpone the hearings. Meanwhile, the other faculties of the university rallied to the support of the medical faculty, while individually some of the professors in the course of their lectures castigated Servetus as an impostor. As the Parlement continued dilatory, the case was presented to the Paris inquisitor as a matter of heresy, a foolish tactic since he had no jurisdiction. The result was acquittal. Now Servetus, previously grown apprehensive, quickly regained his confidence and paid the printers extra money to hasten the completion of his apology so that it might be published and distributed before any further injunction should be issued by the court. In this final action he was aided by Jean Thibault who had his own score to settle with the medical faculty.

Of the *Disceptatio* which was now distributed it may be said briefly that Servetus presents less a strong defence than his usual demonstration of literal-mindedness. If one is willing to accept the literal words of his authorities his arguments have a certain validity, but of course it is merely a display of dialectical ability revolving within the framework of specially chosen statements. As strongly as his opponents were themselves bound by classical authorities, nevertheless they were unable to be influenced by the case Servetus presented. Nor did he aid his cause by the lack of restraint in his presentation.

The trial, when it finally opened in the university on

March 18, 1538/39, was in the nature of an aftermath. The university's legal counsel asked for an injunction to prevent Servetus from teaching judicial astrology in public or private and to prevent him from publishing his apology. Moreover, since it had already been published, they demanded that he confess his error and as far as possible withdraw the apology and deposit the copies of it with the court. The lawyer for Servetus protested that his client had never taught judicial astrology and that the apology was published in self-defence against the scandals created by his enemies. Moreover, Servetus was willing to submit all he had said for the judgment of the court and accept correction where error was demonstrated. Finally, he agreed not to teach judicial astrology in the future.

The decision of the court largely followed the recommendation of the lawyer for the university, with the further injunction that Servetus should show proper obedience and respect for his professors. The alternative to this was exclusion from the university and possible further penalty at the pleasure of the court.

On the whole, Servetus cannot be said to have issued from the fray with any glory. Rather, his impetuous temper, his egotism and an unpleasant bluster contrived to place him in a far from engaging position. It may be that he recognized this, or possibly he was unwilling to bow to the decision of the court. At any rate, as he had suddenly disappeared from Germany in 1532, so now he is heard of no more in Paris, which apparently he left almost immediately.

MICHAELIS

VILLANOVANI IN QVEN.
dam medicum apologetica disce-
ptatio pro Astrologia.

I Nterpellauit lectiones meas, cum Lute
tiz Astronomiam publice profiterer,
Medicus quidam, duabus rationibus ea
totam, tam parte illa, quæ ex astris præ-
dictit, quam alia, quæ cœlestes motus in
strumentis obseruat, subuertere conatus. Quibus
nil aliud plane, quam suam infiditiam prodidit,
imperitum alium sequutus, sub quo præceptore
fuerat rude donatus, ut temere ambo dānēt quæ
penitus ignorant. Philosophos se tamen ii, si diis
placet, & medicos iactat, cū a suis ducibus, Pla-
tone, & Aristotele, Hippocrate & Galeno eos des-
ciuisse ex hoc quiuis manifesto intellicat, quod
oēs Astrologiæ fuerint periti, quā hi nō solum illi
se egregie ignorare fatentur, sed & insectantur pe-
culanter. Illi Philosophiæ familiarissimā, hi aduer-
fissimā cōtentunt. Citabo itaque prius eorū au-
torum testimonia, vtrique astrologiæ parti fauen-
tia, deinde ad rationes veniā. Diuinus igitur Pla-
to in libro de regno, cœli circuitum esse mutati-
onis horum inferiorum causam ostēdit. Et in epi-
nomide, nolite, inquit, ignorare astronomiā sapiē-
tissimum quiddā esse: ibique docet grecos eā ab
ægyptiis didicisse. & i dialogo septimo de legibus
solem & lunā magnos deos appellat. Iū Timæo,

An Apologetic Discourse in Favor of Astrology
and against a certain Physician

by
Michael Villanovanus

Paris

[1538]

When I was lecturing publicly on astronomy at Paris a certain physician¹ interrupted my lectures and attempted by two arguments to overthrow the entire subject, that part which predicts from the stars as well as the other which observes the celestial movements by the use of instruments. Clearly he, the follower of another unskilled person who had been his ill-informed preceptor,² thus displayed nothing less than his ignorance so that both of them rashly condemned that of which they were greatly ignorant. Yet, if it please the gods, they announced themselves as philosophers and physicians, although from this incident anyone may clearly realize that they had withdrawn from their guides, Plato and Aristotle, Hippocrates and Galen, because all of the latter were skilled in astrology of which the former not only confessed themselves to be completely ignorant but which, as well, they impudently attacked. The latter contend that astrology is an intimate of philosophy, the former, a foe. And so first I shall mention the testimonies of those authors favoring both parts of astrology,³ and then I shall come to the arguments.

Therefore, the divine Plato in his *Republic* shows the circuit of the heavens to be the cause of change in terrestrial affairs. And in the *Epinomis* he says: don't ignore the fact that astronomy is a kind of very great wisdom; and he teaches there that the Greeks had learned it from the Egyptians; and in the seventh dialogue on *Laws* he calls the sun and moon great gods. In the *Timaeus*, God

¹ A copy of the original edition was discovered in Paris by Henri Tollin and reprinted (Berlin: Mecklenburg, 1880), from which the present translation has been made. The physician mentioned was Jean Tagault, Dean of the Paris medical faculty. The two arguments are presented farther on by Servetus.

² The preceptor was Pico della Mirandola, the Italian humanist and neo-Platonist who opposed astrology in his *Disputationes adversus astrologiam*.

³ That is, the observation of the stars, closely akin to astronomy and vaguely related to meteorology; and judicial astrology foretelling events largely of human character

by his so great wisdom for good indicates that those four lower elements are in the heavens for another reason—that some stars may produce heat and others, cold. There the sun is called light, brightness, splendor, heat and generation. Indeed, he promises there that elsewhere he will give consideration to the seven planets because of their significance. For those who are concerned with the natural sciences and medicine are not accustomed to turn their attention so extensively to astronomy and other [related] matters, as Galen says in the third book of his *De diebus decretoris* in the following words: At present let us undertake to examine not the first causes of all things, which pertain to astronomy, but what concerns our purpose—we do not doubt that astronomy and astrology were the same to the Greek and Latin writers. Then Plato remarks that one star in the heavens has been assigned to each kind of living things, and in the *Critias* that the influence of the seven planets adjusts to the seven metals, influencing, as he says, the generation of all things. Now as to Aristotle. In the second book of the *Physica* he asserts that astrology is more natural than geometry, adding there that man is begotten from the sun and from man. Also in the seventh and eighth books of the *Physica* he relates all these terrestrial matters to celestial motions; and in the second book *De caelo*, chapter x, he takes his proofs from those things which are said in astrology, and he willingly grants those things considered by astrologers. In chapter xii, he judges an astrologer worthy of respect rather than rash if because of his thirst for philosophy he enjoys his scanty abilities in this subject also; and a little thereafter he adds that he had seen Mars eclipsed by the moon, a truly remarkable thing and therefore related by Aristotle because it rarely occurs. Whereupon I shall digress a little at this point. For in company with certain friends I observed a similar event occurring on the twelfth of this

month of February in the year 1538.⁴ With night falling Mars was eclipsed by the moon near the star which is called king or lion-heart. Whence I predicted it would happen that in this year the hearts of the lions, that is the minds of the princes, would be aroused more greedily to take up arms with Mars, and much would be laid waste by fire and sword, and the church would suffer much, certain princes would die and in addition plagues and other things [would occur] which God avert. But enough of these things.

In the same chapter Aristotle adds that he received from the Egyptians and Babylonians many things worthy of belief concerning the individual stars, and he says almost the same in the sixth chapter of the first book of the *Meteorologica*. Also, Galen in book three, *De diebus decretoris*: what the Egyptians predict from the moon seems worthy of belief. Also Josephus in chapter 16 of the first book, *Of the antiquity of the Jews*: Abraham gave to the Egyptians astrology received from the Chaldeans. Porphyrius, also a highly skilled astrologer, wrote astrological instructions according to the opinion of the Chaldeans. Thales the Milesian, Solon, Pythagorus, Democritus, Plato and others who travelled to Egypt for the sake of learning astrology and geometry, also considered the Egyptians worthy of belief. Therefore, to the greatest philosophers those things seemed worthy of belief which today seem ridiculous to the unskilled. For they are so blinded that they never lift their eyes to the heavens that they may see that most beautiful machine which God did not establish without purpose. Wherefore, as the Holy Scriptures testify, have these things been placed in the form of signs by the Creator himself except that they

⁴ It has been verified that there was an eclipse at Paris, February 13, 1538, at 13h. 9m. 21, Giulio Ceradini, *Opere* (Milan, 1906), I, 260 n. Contrary to Servetus' dire prediction, this was the year of the truce of Nice between Charles V and Francis I.

might signify? and wherefore such a variety of signs except that they designate various things? But I return to the arrangement of Aristotle. In book two, chapter 10, *De generatione et corruptione*, investigating the cause of coming-to-be and passing-away, he concludes that the assistance of the heavens is necessary to these lower things, and thereupon there must necessarily be many motions of the heavens. In addition he adds that the life and time of each mortal will be measured according to that number [distinguishing the life-span]. Thence the approach of the sun to us in the zodiac is the cause of coming-to-be and its departure is the cause of passing-away; this he confirms in the book, *De mundo*. Then in the first book, chapter 2, *Meteorologica*, he says that this lower world is necessarily continuous to the higher influences and thence the whole force of it is governed; and in chapter 3, Aristotle, highly skilled in this art, by astrological theorems affirms that he considers the earth to be smaller than certain stars, and a little after this he takes to task those who consider the natural sciences without an understanding of those theorems. For by mathematical demonstrations astrologers deduce how far the moon is distant from our midst, from the shadow of the earth as well as by the different aspects. Whence is deduced the amount of space sufficing to hold fire and air under the curve of the moon, so that a philosopher is able to have no better proof than this concerning the element of fire. Moreover, in chapter 6, he discourses skillfully of planets, citing Hippocrates who was also skilled in this matter, and praising the Egyptian astrologers; and in chapter 7 he commends celestial speculation; likewise in book two, chapters 4, 5 and 6, he asserts that on account of the influences of the sun and stars, their rising and setting arouse rains and winds, and he locates the winds near the places of the rising and setting on the horizon. This he does in the book *De mundo*; and also in

the book *De divinatione per somnium*, from that which the ancients so believed he proves that there is divination through dreams but that which is from the stars he supports with much stronger argument. But you will say that most of those things that are predicted do not occur. To this Aristotle replies in the same place in these words: It is not truly discordant that many things which are predicted do not occur; and he adduces a parallel from a more apparent thing, that is, astrology and physiognomy. For, he says, neither those signs which are seen in the body nor those in the heavens, such as portend rain and wind, always occur. For if another motion intervenes stronger than that from which those other things which were going to be could occur, then usually nothing results from the sign. If this theory of ours appears to oppose our argument, so by the first argument it proves against Aristotle that there is no physiognomic art for the reason that that which the physiognomists predict does not occur generally. And thus Aristotle who wrote of physiognomy was absurd. However, it must be noticed that the Philosopher [i.e., Aristotle] taught clearly in this place that there are signs in the heavens which portend rains and winds, some of which we see in calendars, but I have said that a judgment cannot be taken from these alone since generally other signs occur contrary to them. However, a skilled astrologer is able to bring all these together into order and to take direction from the many and the more prominent which, indeed, physicians and physiognomists do. It will not be disproof to fall into error, as in medicine, since all these arts are in large part conjectural, as Galen throughout confesses of medicine. For this reason physicians who are so blind in this matter are the more to be censured, since there is nothing whatsoever in astrology for which there is not a parallel in that part of medicine which they call diagnosis, as I shall note in the following.

Indeed, that supervening motion to which Aristotle refers, more easily renders the judgment of the physician false than the judgment of the astrologer by reason of those assisting the patient and because of other external factors; since the astrologer, not the physician, can recognize the very motion which is going to supervene. In a public lecture I gave an example: when others judged that there would be rain, I, from the supervening contrary motion of the stars, said that there would be winds which would drive away the clouds. Likewise, when they judged generally cold weather, I, from other signs which the calendar-makers did not know, predicted very often and publicly that this would be a whole winter without cold.

This seemed marvelous to many, yet the event itself indicates that I had spoken truly. Whence I would not approve those who bring into disrepute themselves and the whole art by predicting from the calendar alone. For of all judgments those of astrologers concerning the mutation of the air are the most dangerous, not only because of other things but also because of the various properties of places unknown to them, just as physicians do not know the special properties of natures; for man in general they treat well in their schools or in their lectures, but not likewise Socrates or Plato [i.e., individual cases]. But to return to Aristotle, in book twelve of the *Metaphysica*, he says that astrology is the most akin to philosophy. You hear that that is the most akin to philosophy which today our philosophers reject. Furthermore, in the beginning of the second book, *De generatione animalium*, he asserts that the heavens are the principal cause of generation, and he deduces a celestial principle; and in chapter 4 he says that menstruation is caused in women by the waning of the moon; with proper reasoning, for he says, on account of the waning of the moon the ends of the lunar months are colder. Note the words of Aristotle,

for no one was ever so ignorant who upon observation did not realize the day to be warmer as the moon is growing to fullness than when it is diminishing. And in the last chapter of book four he says that the moon, almost another and smaller sun, conduces to all generations and completions; for then he adds that the motion of these celestial bodies [i.e., moon and sun] causes heat and cold just as the air and wind are affected according to the circuit of the sun and the moon, so that those things which arise from them or in them must necessarily follow. Furthermore, in the book, *De proprietatibus elementarum*, he testifies that death and famine follow from the conjunction of Saturn and Jupiter. Likewise, in book one, chapter 7, of the *Politica*, he cites Thales the Milesian who knew through astrology that there would be an abundance of olives and in this way was enriched. Also in the book *De mundo* he says that the heavens have a force and power to determine by their motions the appearance, weakness and death, and the space of life, and from this also he says, all things take life, and from this marvellous and strange phenomena come into existence which are accomplished in definite times. Hence the force of the winds roams everywhere, lightning and tempestuous and stupendous rains fall from the sky.

Now we must hasten to Hippocrates, the father of medicine. He, in the book, *Airs, waters and places*, says astronomy contributes not the least but truly the most to medicine. For if anyone comprehends the changes of times and the rise and decline of the stars, he will foresee and prognosticate what kind of year it will be. If anyone prognosticates these things, he says, he will be able to predict the sicknesses which will commonly occur in a city, and be able to aid each one individually and particularly by change of life or diet. And a little after he teaches that certain times must be avoided in the giving of drugs, such

as the summer solstice and the autumnal equinox. Likewise, he says, one must beware the rising and setting of certain stars, such as the rising of the dog star and the setting of Arcturus and the Pleiades. For, according to him, these generally cause mischief, at least in respect to strong purgations and weak bodies. With what countenance will physicians ignoring astronomy dare to read here the immortal god Hippocrates? Let them imitate this teacher who foreseeing a coming plague, warned the Athenians and having sent his disciples, was of great aid to them, as Soranus recalls; whereupon they presented him with great gifts and honors. This year in imitation of him I, if I may be believed, warned the Parisians, just as the Christian princes ought to be warned, that they should arrange peace or at least a truce in this threatening year; for in this manner prudent men are able to be guided by the stars. I have already said what I ought to all Christians. Now to Hippocrates who in the book, *Regimen in acute diseases*, says it is necessary that a physician understand the rise and decline of the stars that he may know how to beware changes and aberrations. And in the book *On fleshes*, whatever of good or of bad is in man to enfeeble, pain or cause him to die is sent from the heavens, and in the book *Eight months' birth*, he says that parturition is deferred or advanced according to the state of the moon at the time of conception. Furthermore, other things from the book. *On wakefulness* and the book *On diseases*, and others can be collected in support of this opinion. Now we must come to Galen, prince of physicians, whose one astrological book, *De praedictionibus ex luna*, will suffice for us, written it appears almost similar to what was written by Hippocrates. Furthermore, in the beginning of the first book, *De epidemiis*, which has been mutilated in the commonly known edition, Galen, following Hippocrates, says that only an astrologer-physician is

able to foreknow future sicknesses and to prevent them breaking out by advising contrary things. For the state of the air is the arrangement of the heavens and depends upon the constitution of the heavens, as Hippocrates himself taught us, which Galen there cites from the book *Airs, waters and places*, in which Hippocrates refers knowledge of this to astronomy although from the air itself certain signs are taken, concerning which book three of the *Aphorisms* and first book of the *Problems*. Galen teaches this more clearly a little later by these words: Therefore I desire that he who is a physician unskilled in astronomy know this, that he is by no means following Hippocrates who urges the employment of astronomy because of the usefulness of predictions. Do our physicians therefore yield to Hippocrates?

Galen urges us by the authority of Hippocrates, for he did not dare on his own authority, fearing the physicians of his time as we shall soon see. Likewise, Galen in the beginning of book three, *De diebus decretoris*, now speaking boldly, says, What arises without order from this material of the world always refers in its order and arrangement to a preceding and received origin in the heavens; indeed, all things on this planet take their ornament and adornment from them; and a little later: certainly we enjoy the power of all the higher stars, and in particular the sun handsomely embellishes and arranges this planet. The great service of the moon appears in the very substance of things, and this manifestly so in marine phenomena. Then he says, the moon guards the time of the menstrual periods in women, guards the course of epilepsy, and by its appearance the moon destroys the slain and wasting bodies of wild beasts; and again: and so more vehement changes occur when the moon joins with the sun, secondly in its full radiation, and thirdly in its quarters. These words are so clear that no one was ever

so stupid who observing could not understand that around the time of the new moon more changes occur in the air. Galen, after citing Aratus, concludes: and so it is fitting to praise astrologers who have written concerning these things, not omitting even the slightest thing. I beg, readers, compare this place with that of Aristotle, already mentioned, in which he praises astrologers because by reason of a thirst for philosophy they seek even the least powers of the stars; read these things in the authors themselves, for they will affect you much more vehemently, and then judge how unworthily we, because of the investigation of individual motions, are censured by those who are content with this alone, that they know that the heavens in general are moved, although they truly do not know this. For I saw one who in the schools publicly denied the various motions of the planets, for one motion suffices for the whirling about of the element of fire, nor do they wish the elements to be moved from the heavens otherwise. Those against whom the philosopher disputes are truly unworthy when they deny those things which are manifest to the senses and accepted by all philosophers. Then Galen concluding the *De diebus decretoris*, from the motion of the moon says: We find it very true as offered by the Egyptian astronomers, that the moon is able to foretell what sorts of days will occur, not only for the sick but also for the well; for if, he says, it has aspect with the temperate planets, good; with the intemperate, bad. He gives yet another very useful example for astronomers from the judgment of nativities from which, indeed, the whole of his book, *De praedictionibus ex luna*, takes origin, lest anyone pretend that it is not by Galen. You, reader, beware lest you read these things with the eyes of the mind closed. Consider, he says, the planets to be favorable for a certain man being born under Aries, unfavorable under Taurus; this man therefore continues well when the moon is in

Aries, Cancer, Libra or Capricorn; he lives poorly when it enters Taurus itself, in quartile or opposed aspect. Likewise, for this one the beginning of sicknesses will be very bad when the moon is in Taurus, Leo, Scorpio or Aquarius; however, without danger when the moon traverses Aries, Cancer, Libra or Capricorn. By the immortal God, how much might be inferred from this if I dealt with those skilled in astronomy. Now, in conclusion Galen says against our adversary: If you scorn those things which are undoubted by astronomers, nor put faith in those who investigate, undoubtedly you are then one of the sophists clamoring on all sides who demand that we prove by manifestly apparent argument, although, on the contrary, reason of hidden things must be sought from the clearly apparent. O great Galen, O opinion worthy of golden letters and truly prophetic. For they compel us today to prove by argument that the sun shines; for they do not see it or any of the other things which are in the heavens because they never observe anything, but deny all things and yet contend that they believe with Galen. Picus,⁵ certainly the sharpest of the enemies, confesses that Galen favors astrologers, a thing which the adversaries to their shame dare to deny. For not understanding his words, our adversary and his preceptor not only explain incorrectly but also they raved impudently and publicly against astrology. Later a certain ape emulated them in the investigation of the causes of the Neapolitan disease, attributing nothing to the heavens, although the philosopher [i.e., Aristotle] taught us above that marvellous and strange phenomena come from them since new forms cannot appear from elsewhere for the same reason that no combination of the elements can produce the appearance of a new phenomenon in the skies; indeed, according to Aristotle the elements cannot undertake any particular

⁵ Pico della Mirandola.

combination unless they are specially directed by the heavens. For what other thing is behind the causes? But that sophist, disputing about the influence and whether it is a certain quality, omitted the very matter itself. Finally, Galen, since in his age there was such a plague of physicians, like those of today, swore by the immortal gods that he had discoursed on astronomy, compelled by the entreaties of friends; for he would not have done this of his own accord, seeing that other things, or rather trifles, pleased the physicians of his own time, and these matters were invidious to them. However, he assures us that he has offered the true conclusions of astronomers which he confirms had first been learned by Hippocrates; note the word, you who interpret Hippocrates ridiculously. Wherefore did that one not enumerate days as unchanged except on account of the moon? As Galen explains, he speaks also timidly of astronomy. By a similar reason at the end of the tenth book *De usu partium* he testifies that he did not dare to speak of astronomy or geometry lest he be hateful to the very inept physicians of his time. Shall we, therefore, like Galen also be silent in fear of them? Indeed, we shall pronounce the truth, affirming that they have degenerated from their predecessors. By the immortal God, I swear with Galen that I, not of my own accord, but driven to it by friends,⁶ have turned aside to mathematics although I was wholly in medicine. For I knew that I would have to contend with so many monsters. But after I have descended into the arena I shall stand firm.

Therefore I shall cite the arguments of the adversary, and I shall so remove them that they may both be turned against him.

His first argument:

If astrologers often deceive and do not speak true things, employ inconsistent and unsuitable precepts, and

⁶ Presumably Archbishop Palmier and Jean Thibault.

if astrologers are inconsistent and contrary, therefore astrology of this sort is not an art; therefore, if they often deceive and do not speak the truth, astrology of this sort is not an art.

Second argument:

If the designation of the horoscope were certain, it would be necessary that the astrolabe deceive neither the diopter nor the eye; if it deceives neither the diopter nor the eye it will be necessary that the heavens remain quiescent and spread themselves out on all sides to the eye; that this may be, it is necessary that they be not as they are; therefore that the designation of the horoscope may be certain, it is necessary that things be not as they are.

Reply:

How nicely the sophist trifles and pleases himself by his puerile arguments, and plainly all his arguments are very inept from which he has raked together those syllogistic hypotheses, such as his first argument already refuted by Aristotle. He does not know, as I see, the difference between universal precepts from which the arts are formed and particular judgments which are not consistent. The precepts of Hippocrates in the *Book of prognostics* are consistent; however, from them two physicians will judge things differently and even completely opposite to one another. From the same laws two judges in the same case will hold different opinions, and even completely opposed, because of different conjectures, different dispositions, different influences and differing erudition. Therefore will they overthrow the laws and the precepts of Hippocrates? Not at all. And so the precepts of skilled astrologers are very consistent, but the particular judgments which are gathered from those things conjectured variously by various men are not consistent. Therefore the conclusion of his first argument is invalid if he condemns the precepts in their entirety. If he wishes to contend that the pre-

cepts of just certain ones are erroneous, although I concede this to him, the art is not destroyed; and then he has erred in his second argument. For in all arts there are dissidences and varying opinions which do not argue the imperfection of the art but of the practitioners. Indeed, from these the arts may finally be illustrated, as Pontanus, in book twelve of the *De rebus coelestibus*, teaches in many things contrary to Mirandola.⁷ Therefore it can only be concluded from the errors that they who err so often are unskilled in the art. Thus often, I say, at times when all things have been observed by a highly skilled person the prognosis does not succeed; this occurs in medicine according to the testimony of Hippocrates in the aphorism: If it does not succeed for the one doing all things according to reason, etc. For there are very many conjectures which we use in diagnosis and prediction. Indeed, if we observed all things clearly we would be gods, not men. And so God grant us to admire wisdom, to recognize our weakness, but not to condemn the arts.

As to the second argument:

The second argument is even more strange, for when he wishes to seem skilled in mathematics he raves childishly. In the first place, a horoscope can be found without an astrolabe, for if I see the rising sun and its inclination has been known to me from a calendar or another source, the horoscope will then be found. Likewise, in [Ptolemy's] *Geography* I taught that the meridian line can be found in four ways, and this having been found the meridian is known and thence the horoscope. But will it be necessary, as according to this person, that at whatever hour I wish to find a horoscope through the use of astrolabes, whether alone or whether through the altitude of some one of the other stars, that the heavens remain quiescent? Perhaps it

⁷ Giovanni Pontano, who wrote his *De rebus coelestibus* in favor of astrology and in part at least as an answer to the criticism of Pico della Mirandola.

may seem so to one unskilled, but not to a philosopher. For according to the testimony of Aristotle in the book, *De sensu et sensibili*, chapter 6, and book two, chapter 7 of *De anima* against Empedocles, the ray of the sun illuminates all parts of the same straight space not in time but in a moment of time, as is seen; therefore, it is not that you imagine the sun, now fixed in the meridian, is going to recede thence before the rays from it may come to us; indeed, in that same moment of time its rays will be seen entering the openings through the pinnules of the astrolabe. But, finally, if it is not the same moment of time, will the art therefore be destroyed? Shall we alone compel ourselves to draw the lines without error from point to point? This person despises the mote in our eye, but he does not see the beam in his own; for thus the argument can be twisted back against him. If the treatment made by the physician were to be certain it would be necessary that the medicament have such numbers of contrary qualities as the sickness might have beyond its own temperament; if this were so, it would be necessary that those three numbers be known to the physician perfectly, and therefore the qualities of the elements be observable to him and measured with precision. However, it is not necessary that this be so since Galen in the book *De temperamentis et arte medica* teaches that our temperaments are recognized merely by the roughest conjectures, and that even when these things are known you may not know how to measure the numbers. Likewise, I also conclude from this that it is necessary that the heavens remain quiescent for from that time in which the physician conjectures these remedies to the time in which they will be employed, already there will have occurred some change in the illness because the heavens have moved. Shall we order the sickness and the heavens meanwhile to remain quiescent? [The adversary] perhaps does not know

what was written by Hippocrates: a sudden occurrence; therefore if that moment of time escapes the astrologers, just as in the case of physicians, no more, therefore, should the one art be destroyed than the other. Indeed, it is more sudden for the physicians than the astrologers, for the latter observe visible things while from the former the interior parts of the body lie hidden more, and they err generally with a greater cost in lives because of ignorance of astronomy.

Another argument which he applies is of insupportable ignorance. If, he says, the astrolabe does not deceive, it is necessary that the heavens on all sides display themselves to the eye. What do I hear? Will it be necessary to climb a mountain to look all around the horizon? Will not a horoscope be found from whatever star is seen through a window? The matter, by Hercules, is known to those unlearned in science and displays the ignorance of this person who by an argument of this sort dares to oppose us. Also it should not be omitted that another physician criticized an astrologer who was about to sail for Rouen, and although he had predicted for others did not predict for himself that surely the ship would depart leaving the astrologer behind. But a little later when this physician taught what the signs of the Gallic disease are and warned his auditors how they ought to beware infected women, it so happened to him, so little did he know the disease, that he did not realize that he was infected, nor was he able to cure the chancre growing on his penis. And so neither physician nor astrologer was able to foretell for himself since for these conjectures the mind must be free from outside influences. I wished to collect these things, offered by no one before, for your sake, my auditors, so that you may have material for consideration if sometime some one of this sort shall make an attack on our art.

Farewell

V

THE SECOND EDITION OF
PTOLEMY'S GEOGRAPHY (1541)

WHEN Servetus left Paris so suddenly in 1538 he seems to have returned first to Lyons. From there he passed on to Avignon, thence back to Lyons and finally established himself at Charlieu some forty miles away where he practised medicine for three years. Years later in his interrogation at Geneva he mentioned two incidents related to his sojourn at Charlieu. The first refers to a projected marriage which he finally abandoned because of the belief that he was impotent. The second casts some light on the medical ethics of the time and the dangers of a successful practitioner. The report of the Genevan interrogation presents this as follows:

When he was in the city of Charlieu, one night going to visit a patient, through the envy of another physician of the aforesaid city he was set upon by certain of the [physician's] relatives and friends. [Servetus] was wounded and also wounded one of the others as a result of which he was placed under arrest for two or three days.¹

From Charlieu Servetus next returned to Lyons where he once again entered into relations with Archbishop Palmier, former auditor of his lectures on mathematics and astronomy in Paris. Palmier was a scholar, or at least a dilettante who enjoyed the company of scholars. Not long before, he had induced Gaspard Trechsel to establish

¹ *Calvini opera*, VIII, 781 (ed. Corpus reformatorum).

his press at Vienne, the archiepiscopal seat and about fifteen miles to the south of Lyons. Similarly he now prevailed upon Servetus to remove his medical practice from Charlieu to Vienne. The attraction of Palmier's patronage, the stimulation of the group of scholars he had assembled and the fact that his personal physician, Jean Perrell, had been a fellow-student with Servetus in Paris probably led him to make the change which appears to have been a happy move. He seems to have established good relations with the major personages in the vicinity, his practice flourished and not the least of the benefits to him for the future was his success in curing the only daughter of Antoine de la Court, the vice-bailiff, from a serious illness.

Meanwhile Servetus had continued his work as editor and as corrector of the press. Before leaving Charlieu he had entered into a contract to edit a six-volume edition of the *Bible* for a publishing concern in Lyons and, in 1541, a second edition of his *Ptolemy* printed at Vienna by Trechsel and published at Lyons by Hugues de la Porte. In addition to the correction of small errors, the harsh characterization of the Germans according to the regions in which they lived was deleted, as was the passage about the "promised land" of Palestine. Servetus' doubt of the efficacy of the royal touch in France was softened although not removed since he now remarks, "I have heard that from time to time many were cured." The new edition, somewhat less handsome than the first, was dedicated to Archbishop Palmier with a flattering letter which is valuable for the biographical information which it contains.

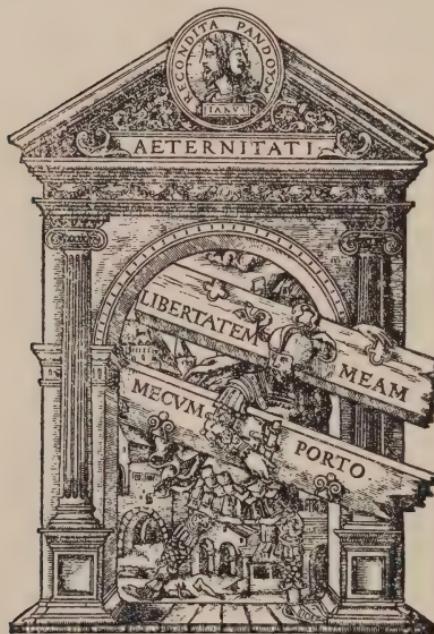
C L A V D I I

P T O L E M A E I
A L E X A N:
D R I N I

Geographicæ Enarrationis,
Libri Octo.

EX B I L I B A L D I P I R C K E.
ymberi traktione, sed ad Graeca & præca exemplaria à Michaële Villanouano
secundò recogniti, & locis innumeris denuò configitati. Ad diecta insuper ab eodem Scho
lia, quibus & difficultis ille Primus Liber nunc primum explicatur, & exoleta Vrbium
nomina ad nostri seculi morem exponuntur. Quinquaginta ille quoque cum veterum tum
recentium Tabulae adnectuntur, uarijsq[ue] incolumum ritus & mores explicantur.

Accedit index locupletissimus battemus non usus.



Prostant Lugduni apud Hugonem à Porta.

M. D. XLI.

The Eight Books of the Account of Geography
by
Claudius Ptolemy of Alexandria

For the second time edited according to the translation of Bilibald Pirckheimer, but compared to the Greek and early editions and emended in innumerable places by Michael Villanovanus. In addition scholia have been added in which that difficult first book is now explained for the first time, and the obsolete names of cities have been given according to present usage

Also fifty maps have been added of the ancient as well as more recent times and the various rites and customs of the people are described

Published at Lyons by Hugues de la Porte

1541

*Michael Villanovanus to the most magnificent, illustrious
and reverend master Pierre Palmier, distinguished Arch-
bishop of Vienne²*

After that first edition of Ptolemy's *Geography* with my annotations, when, most distinguished arch-patron, in your presence and with your patronage I was lecturing publicly on mathematics in Paris, I exerted myself diligently to produce this second and much revised edition. In this matter your keen judgment—since you deplored the corrupt passages throughout the former edition—was no slight spur to me, while the promptings of Hugues de la Porte, bookseller of Lyons, and a very worthy man in all literary affairs who spared no expense that our Claudius Ptolemy might be purged as much as possible from the mistakes scattered through it, acted as an additional spur. It is a pleasure to dedicate my efforts, indeed the whole revised Ptolemy itself, to your sacred name because you above all consecrated bishops whom I have ever known love good letters, foster literary men and give constant attention to geography itself. I am furthermore impelled by the great kindnesses which I have received from you who for many years now have been my Maecenas, who have deigned to accept Ptolemy's *Geography* from me. Whence deservedly Ptolemy, who already knows the client, will now finally recognize the patron. For under what other leader would it have been fitting for Ptolemy to appear emended and printed in Vienne than under you, the very leader of the people of Vienne? and a student of Ptolemy? Vienne of the Allobroges, I say, and how properly our Claudius will rejoice that Vienne, already long known to him and celebrated in its antiquity among the cities of the Gauls and as a colony of the

² This translation was made from the translator's personal copy of the 1541 Ptolemy.

Roman emperors, now sustains him. Above all he will rejoice when he perceives that so many who are learned in his *Geography* dwell in Vienne. Among those achieving such eminence are your kinsmen, Jean Palmier, prior of Sanctus Marcellus, and Claude de Rochefort, your vicar-general, both very accomplished men and deserving of commendation in many respects, to whom I owe as much as those who are students of geography owe to Ptolemy himself. I make no mention here of those things which that great prior of Sanctus Petrus and Sanctus Simeon, Johannes surnamed Albus, forbade me to mention of his virtues. Nor do I dare speak here of that sacred triad of your officials, nor to insert their three names here since I consider that I could not say enough for their dignity. Furthermore, the multiplex erudition in philosophy and languages of Jean Perrell, your doctor of medicine and once my comrade in studies in Paris, requires another and greater herald.

And so returning to you, O most distinguished patron, I shall believe that I have been sufficiently successful in my lucubrations if you will accept them into your patronage with that humanity which is usual to you. Thus they will realize that they are sufficiently commended and approved since they have not displeased your most keen judgment. But since the matter which I treat is both difficult and lies extended across many centuries, may I be granted indulgence if occasionally it should happen that I waver in such great decisions of things or see but dimly through human obscurity. For no one always hits the nail on the head, as the proverb has it, nor will the arrow always hit what it is aimed at. Indeed, Pliny, Strabo and Mela, who dealt with geography, differed so greatly in most things that they cannot be recalled into agreement by any persuasion of speech. Furthermore, the destruction of time and wars that supervened has resulted in some

cities being completely lost and others altered, while almost all their names have undergone change. But what can the pig teach Minerva? All these things are known, I say, known to you who have traversed a good part of the earth and have carefully studied all those who wrote about geography, like the most Christian King of France who, since he is a lover of studies, also in this matter is marvellously learned. And it is fitting that the greatest princes who rule the earth should know the earth; it is also fitting for those who serve princes, and especially when they are sent as legates to various parts of the earth, which has very often been your lot under that same prince. There occurs the pleasure of knowledge acquired, by which the intellect is adorned and the mind is pleasantly affected; otherwise we shall wander like cattle in a desert with no sure guide for our life. But again I am an owl to Athens. Therefore, O most distinguished patron, take this very useful work of geography by the most excellent Claudius Ptolemy, restored by me with the greatest care, which rests upon your patronage and recognizes you alone as its Maecenas. Farewell and may you be eternally blessed, most illustrious arch-patron.

Vienne, the last day of February, 1541.

VI

THE "CHRISTIANISMI RESTITUTIO" (1553)

THE DESCRIPTION OF THE LESSER CIRCULATION

THE year following the appearance of the revised edition of the Ptolemy there was published the Pagnino *Bible*, that is, a new translation of the *Bible* by Xantes Pagninus, a Dominican monk, to which Servetus contributed a preface and scholia. While we are not primarily concerned here with Servetus' theological works, nevertheless it should be mentioned that it may have been his editorial work on the *Bible* which revived, or at least helped to revive, his interest in religious matters and so led on to the composition of the *Christianismi restitutio* and ultimately to his execution.

Whatever may have been the original impulsion, Servetus now determined to see if he might be more persuasive with Calvin than he had been with the Zwinglians and Lutherans ten years earlier. With the aid of Jean Frellon, a publisher of Lyons, as go-between, Servetus opened a correspondence with Calvin. Both parties employed pseudonyms to conceal their true identities, Servetus now rashly using his true name since the important thing for the moment was to conceal the fact of his existence as Villanovanus.

While Servetus was, at least in theory, seeking to learn, characteristically he quickly found and informed Calvin that his theological position was thoroughly untenable, and Calvin, after several exchanges of letters, realizing his inability to persuade his correspondent, sought to break

off communication. Servetus, on the contrary, wished to continue it, sending Calvin first what appears to have been an early draught of the *Christianismi restitutio*, then such works of Calvin as he could obtain and to which he added insulting marginalia, and thereafter a long series of letters. To all these things he received no reply, but he gained an implacable enemy. Servetus' actions must be termed nothing short of childish and stupid.

Finally recognizing the futility of any further attempts to revive his correspondence with Calvin, Servetus' next action was entirely within the impetuous pattern of life that he had already formed for himself. Just as in 1531 and 1532, when he had been unable to persuade the religious leaders to his views, he had sought the publicity of the printing press, so now he completed and revised his *Christianismi restitutio* for publication. Finished in 1552, it was secretly and cautiously printed in Vienne in an edition of 1,000 copies and early in 1553 distributed in bales for the forthcoming spring book fairs.

At about the same time Calvin had learned that Michael Servetus and Michael Villanovanus were one and the same person and as a result caused this information to be laid before the authorities in Vienne; in consequence Servetus was questioned and eventually imprisoned. The discovery of evidence of a heretical nature would have sealed his fate had it not been for his escape from prison, possibly connived by friends among whom may have been the grateful vice-bailiff whose only daughter Servetus had previously cured of a serious ailment. But having escaped from Vienne, the position of Servetus continued perilous in the extreme. He could not remain in France nor could he return to Spain, Germany or Switzerland, although he must go through Switzerland and Geneva to the only asylum which he saw open, that is, southern Italy. Thus it was that passing through Geneva, unluckily at the end of

the week, he felt compelled to attend divine services where he was recognized and promptly imprisoned. Suffice it to say Calvin was determined to have his victim despite the fact that legally he had no grounds at all for a case. Personal vindictiveness—partly, it must be admitted, the result of Servetus' foolish baiting of Calvin—intolerance, and disregard of the law, even though Calvin had been trained in it, brought about the execution of Servetus at the stake on October 27, 1553.

Previous to this final episode the printing and distribution of the *Christianismi restitutio* had come to the attention of the authorities in France and Switzerland, with the result that the copies of the book, mostly still in bales, were tracked down and destroyed with such thoroughness that only three copies are known to exist today. For our present purpose the significance of the book is to be found in six pages, 168–173, in which is presented the first printed account of the circulation of the blood through the lungs.

There has been much idle discussion as to who actually first recognized this aspect of the circulation of the blood, Servetus or Realdus Columbus, the Italian anatomist whose account was published posthumously in 1559, and since the discussion has acquired a nationalistic tone, Spaniard versus Italian, obviously there will never be agreement.¹ Such debate is idle because the time was ripe for the discovery and in a sense many participated in it, those who had made the texts of Galen available, the anatomists who had carried their studies up to the threshold of the discovery, and no doubt anonymous physicians who had debated and discussed innumerable plausible and implausible hypotheses in regard to anatomy and physiology, some of which must have encroached upon this sub-

¹ On this whole controversy see Earl Morse Wilbur, *A bibliography of the pioneers of the Socinian-Unitarian movement* (Roma, 1950), pp. 69–74.

ject. More important than the question of who was first is the question of how precisely did Servetus—since we are dealing only with him—gain this glimmer of truth, since it will be noted that his description is rudimentary.

In the course of his description Servetus remarks that it represents “a truth which was unknown to Galen” and refers specifically to books VI and VII of *De usu partium*. Servetus’ remark is correct if we understand “truth” to mean merely a difference in emphasis. Actually Galen had presented all the necessary information required for Servetus’ description. Let us not forget that in all his writings of a medical character Servetus has revealed himself as a confirmed and literal student of Galen.

The basic problem of both Galen and Servetus was how to move the blood from the right ventricle of the heart to the left. Galen’s solution was to have the blood sweat through minute openings or pores in the septum of the heart, while Servetus announced that the transit occurred by a long course through the lungs. This was the basic difference between them since otherwise Galen had roughly described the existence of those vessels and their functions which were necessary for Servetus’ discovery. One might say that there were two possible routes for the blood and that by the closing of the one the other became essential. Furthermore, when Servetus denied the transit of the blood through the septum of the heart he was not displaying any great originality. Already Vesalius had cast some doubts on this passage in his *Fabrica* (1543) although his complete denial of this route does not appear until the second edition of 1555. Nevertheless it may have been closer to the first than to the second edition that Vesalius came to his final conclusion, and either in relation to Vesalius directly or through the influence of his book there must have been discussion among physicians, some of whom may have taken an anti-Galenical position in

conversation although still too timid to express it in the permanence of print. Indeed, anatomists other than Vesalius must have been reaching the conclusion that if they couldn't see pores in the septum they didn't exist.

In conjunction with the denial of the transit of blood through the septum of the heart, there are two points in Galen's description of the veins and arteries which then make the discovery of the passage of the blood through the lungs fairly obvious and at the same time a matter which could be described by a Galenist such as Servetus without doing violence to his authority. First, Galen proclaimed the presence of blood in both veins and arteries; second, he announced that there is anastomosis between the minute branches of veins and arteries and that “they mutually receive blood and spirits from each other through invisible and extremely minute passages.” In respect to Servetus' discovery this would have its most important application in the lungs where, however, the exchange of blood from the pulmonary artery to the pulmonary vein would be interrupted by expiration since the pulmonary artery would then be compressed. Yet even here Galen provided a way out of the difficulty by demonstrating that the semilunar valves prevented the blood being forced back into the right ventricle. Thus the blood retained would eventually find its way into the pulmonary vein by means of anastomosis. Galen may be said to have made his mistake by declaring that only a very small portion of the blood passed from artery to vein in this fashion and that the great bulk of it passed through the septum of the heart from right to left ventricle. Here Servetus made a quantitative reversal by stating that the bulk of the blood passed through the lungs from the pulmonary artery into the pulmonary vein, and a very little, as he said, may pass through the septum of the heart.

The problem is then resolved into a further question: why did the literal-minded Servetus reverse Galen's ar-

rangement. Here it seems likely that the requirements of theology were responsible. Despite Servetus' interest in medicine it must not be forgotten that to a considerable degree he was what might be termed a medical philologist and that his formal medical training in Paris was of brief duration. It is true that he had been praised by Guinther of Andernach as his assistant in anatomy, but the kindly professor was himself more philologist than anatomist. What Servetus was primarily concerned with was the introduction of the divine spirit into the blood because "It is not said that the divine spirit is principally in the walls of the heart, or in the body of the brain or of the liver, but in the blood, as is taught by God himself." In short, the literal bibliclist, aided by a perhaps slight yet sufficient knowledge of anatomy, had influenced the literal Galenist to the degree of shifting not the facts of Galen but merely the emphasis that Galen had placed upon those facts.

Finally, it should be noted that Servetus is concerned with the dissemination of the vital spirit throughout the whole body, and he remarks that "vital spirit is then transfused from the left ventricle of the heart into the arteries of the whole body." If we consider that by the adoption of his "ingenious arrangement" Servetus has nullified the old Galenical idea of the ebb and flow of the blood, the implication of a complete circulation of the blood is obvious; indeed, not only physiology but theology especially required it. However, Servetus the theologian had made his point and there was no reason for him to pursue the matter any further—presuming that he could have done so. In the final analysis Servetus' account must be considered not as an anatomical or a physiological but rather a theological argument in support of a theological thesis.

CHRISTIANI-
SMI RESTITV.
TIO.

Totius ecclesie apostolice est ad sua limina vocatio, in integrum restituta cognitione Dei, fidei Christi, iustificationis nostræ, regenerationis baptisi, & cœne domini manducationis. Restituto deinde nobis regno caelesti, Babylonis impie caput case soluta, & Antichristo cum suis penitus destructo.

בָּאָז וְהַיָּה יְעֹבָד מִיכָּאֵל הָשָׁר
נְאַתְּרֵת אֶתְּנָאָס בְּעַבְרֵךְ.

M. D. LIII. 11



The Restoration of Christianity

The whole apostolic church is summoned to the threshold. Once again there is restored knowledge of God, of the faith of Christ our justification, of the regeneration of baptism, and of participation in the Lord's Supper. And finally with the heavenly kingdom restored to us, the wicked captivity in Babylon has been ended and anti-christ with his hosts destroyed.

And at that time shall Michael stand up.
And war broke out in heaven.

[Vienne]

1553

* * * *

Not² only because of such gifts, but by reason of that one alone who breathes the divine spirit into us, God is said to give us his spirit, Gen. 2 and 6. Our soul is a kind of lantern of God, Prov. 20. It is like a spark of the spirit of God, a reflection of the wisdom of God, created yet very similar to that spiritual wisdom, incorporated in it, retaining the innate light of divinity, the spark of that prime wisdom and the very spirit of divinity. God himself testifies, in chapter 6 above, that the spirit of divinity was innate in man even after Adam's sin. The dispensation of our life is given and is sustained through grace from his breath, as Job says, chap. 10 and 32 and following. God breathed the divine spirit into Adam's nostrils together with a breath of air, and thence it remains, Isaiah 2 and Psa. 103. God himself maintains the breath of life for us by his spirit, giving breath to the people who are upon the earth and spirit to those treading it, so that we live, move and exist in him, Isaiah 42 and Acts 17. Wind from the four winds and breath from the four breaths gathered by God revive corpses, Ezek. 37. From a breath of air God there introduces the divine spirit into men in whom the life of the inspired air was innate. Hence in Hebrew "spirit" is represented in the same way as "breath." From the air God introduces the divine spirit, introducing the air with the spirit itself and the spark of the very deity which fills the air. The saying of Orpheus is true, that the divine spirit is carried by the winds and enters through full inspiration, as Aristotle cites in the books, *De anima*. Ezekiel teaches that the divine spirit contains a kind of elemental substance and, as God himself teaches, something in the substance of the blood. I shall explain this matter at

² This translation was made from photostats of the page-for-page reprint (Nürnberg, 1790), made available through the kindness of Professor John F. Fulton.

greater length here so that you may thence understand that the substance of the created spirit of Christ is essentially joined to the very substance of the holy spirit. I shall call the air spirit because in the sacred language there is no special name for air. Indeed, that fact indicates that the divine breath is in the air which the spirit of the Lord fills.

So that you, the reader, may have the whole doctrine of the divine spirit and the spirit, I shall add here the divine philosophy which you will easily understand if you have been trained in anatomy. It is said that in us there is a triple spirit from the substance of three higher elements, natural, vital and animal. Aphrodisaeus calls them three spirits. But they are not three but once again of the single spirit (*spiritus*). The vital spirit is that which is communicated through anastomoses from the arteries to the veins in which it is called the natural [spirit]. Therefore the first [i.e., natural spirit] is of the blood, and its seat is in the liver and in the veins of the body. The second is the vital spirit of which the seat is in the heart and in the arteries of the body. The third is the animal spirit, a ray of light, as it were, of which the seat is in the brain and the nerves of the body. In all these there resides the energy of the one spirit and of the light of God. The formation of man from the uterus teaches that the vital spirit is communicated from the heart to the liver. For an artery joined to a vein is transmitted through the umbilicus of the foetus, and in like manner afterward the artery and vein are always joined in us. The divine spirit of Adam was inspired from God into the heart before [it was communicated into] the liver, and from there was communicated to the liver. The divine spirit was truly drawn into the mouth and nostrils, but the inspiration extended to the heart. The heart is the first living thing, the source of heat in the middle of the body. From the liver it takes the liquid of

life, a kind of material, and in return vivifies it, just as the liquid of water furnishes material for higher substances and by them, with the addition of light, is vivified so that [in turn] it may invigorate. The material of the divine spirit is from the blood of the liver by way of a remarkable elaboration of which you will now hear. Hence it is said that the divine spirit is in the blood, and the divine spirit is itself the blood, or the sanguineous spirit. It is not said that the divine spirit is principally in the walls of the heart, or in the body of the brain or of the liver, but in the blood, as is taught by God himself in Gen. 9, Levit. 7 and Deut. 12.

In this matter there must first be understood the substantial generation of the vital spirit which is composed of a very subtle blood nourished by the inspired air. The vital spirit has its origin in the left ventricle of the heart, and the lungs assist greatly in its generation. It is a rarefied spirit, elaborated by the force of heat, reddish-yellow (*flavo*) and of fiery potency, so that it is a kind of clear vapor from very pure blood, containing in itself the substance of water, air and fire. It is generated in the lungs from a mixture of inspired air with elaborated, subtle blood which the right ventricle of the heart communicates to the left. However, this communication is made not through the middle wall of the heart, as is commonly believed, but by a very ingenious arrangement the subtle blood is urged forward by a long course through the lungs; it is elaborated by the lungs, becomes reddish-yellow and is poured from the pulmonary artery into the pulmonary vein. Then in the pulmonary vein it is mixed with inspired air and through expiration it is cleansed of its sooty vapors. Thus finally the whole mixture, suitably prepared for the production of the vital spirit, is drawn onward from the left ventricle of the heart by diastole.

That the communication and elaboration are accom-

plished in this way through the lungs we are taught by the different conjunctions and the communication of the pulmonary artery with the pulmonary vein in the lungs. The notable size of the pulmonary artery confirms this; that is, it was not made of such sort or of such size, nor does it emit so great a force of pure blood from the heart itself into the lungs merely for their nourishment; nor would the heart be of such service to the lungs, since at an earlier stage, in the embryo, the lungs, as Galen teaches, are nourished from elsewhere because those little membranes or valvules of the heart are not opened until the time of birth. Therefore that the blood is poured from the heart into the lungs at the very time of birth, and so copiously, is for another purpose. Likewise, not merely air, but air mixed with blood, is sent from the lungs to the heart through the pulmonary vein; therefore the mixture occurs in the lungs. That reddish-yellow color is given to the spirituous blood by the lungs; it is not from the heart.

In the left ventricle of the heart there is no place large enough for so great and copious a mixture, nor for that elaboration imbuing the reddish-yellow color. Finally, that middle wall, since it is lacking in vessels and mechanisms, is not suitable for that communication and elaboration, although something may possibly sweat through. By the same arrangement by which a transfusion of the blood from the portal vein to the vena cava occurs in the liver, so a transfusion of the spirit from the pulmonary artery to the pulmonary vein occurs in the lung. If anyone compares these things with those which Galen wrote in books VI and VII, *De usu partium*, he will thoroughly understand a truth which was unknown to Galen.

And so that vital spirit is then transfused from the left ventricle of the heart into the arteries of the whole body so that that which is more rarefied seeks the higher regions where it is further elaborated, especially in the retiform

plexus situated under the base of the brain, and, approaching the special seat of the rational soul, the animal spirit begins to be formed from the vital. Again it is more greatly rarefied by the fiery force of the mind, elaborated and completed in the very slender vessels or hair-like (*capillaribus*) arteries which are situated in the choroid plexuses and contain the mind itself. These plexuses penetrate all the inmost parts of the brain, internally girdling the ventricles of the brain, and those vessels, enfolded and woven together as far as the origins of the nerves, serve to introduce in these last the faculties of sensation and of motion. Those vessels in a very remarkable way are woven together very finely, and even if they are called arteries, nevertheless they are the termination of arteries extending through the assistance of the meninges to the origin of the nerves. It is a new kind of vessels. For just as in the transfusion from the veins into the arteries there is a new kind of vessels in the lung, from vein and artery, so in the transfusion from the arteries into the nerves there is a new kind of vessels from the tunic of the artery in the meninx, since especially do the meninges preserve their tunics in the nerves. The sensibility of the nerves is not in their soft material, as in the brain. All nerves end in membranous filaments which have the most exquisite sensibility and to which for this reason the spirit is always sent. And from those little vessels of the meninges, or choroid plexuses, as from a source, the clear animal spirit is poured forth like a ray through the nerves into the eyes and other sense organs. By the same route, but in reverse, light images of things causing sensation, coming from without, are sent to the same source, penetrating inwardly, as it were, through the clear medium [i.e., spirit].

From these things it is sufficiently clear that that soft mass of the brain is not properly the seat of the rational soul, since it is cold and lacking in sensation. But it is like

a bolster for the aforesaid vessels lest they be broken, and like a custodian of the animal spirit lest it blow away when it must be communicated to the nerves; and it is cold that it may temper that fiery heat contained within the vessels. Hence also it happens that the nerves serve the tunic of the membrane in the internal cavity, which is common to the aforesaid vessels as a faithful guardian of the spirit, and they hold this [away] from the thin meninx just as they hold another from the thick. Also those empty spaces of the ventricles of the brain which puzzle philosophers and physicians contain nothing else but the spirit. But those ventricles were made in the first place like a cloaca for the reception of the purgings from the brain so that they may test the excrementa received there, from which morbid defluxions arise, and provide a passage to the palate and nostrils. And when the ventricles are so filled with pituita that the arteries themselves or the choroid plexuses are immersed in it, then suddenly apoplexy is aroused. If a very noxious humor obstructs a part, and its vapor infects the mind, epilepsy occurs, or another disease, according to the part into which it settles when it has been expelled. Therefore let us say that it is the mind which we clearly perceive to be afflicted. From the immoderate heat of those vessels, or from the inflammation of the meninges, obvious delirium and frenzy occur. Whence from the diseases occurring by reason of site and substance, by force of heat and because of the ingenious construction of the vessels containing it, and from the actions of the mind apparent there, we always conclude that those little vessels must be given first consideration because all the rest serve them and because the nerves of sensation are tied to them so that they may receive their force from them. Finally, because we perceive the intellect exerting itself there when, as a result of concentrated thought, those arteries are pulsating as far

as the temples. He who has not seen this thing will scarcely understand. Those ventricles were made for a second reason, that a portion of the inspired air penetrating through the ethmoid bones to their empty spaces, attracted by diastole from the vessels of the spirit, may refresh and ventilate the animal spirit contained within and the soul. In those vessels are mind, soul and fiery spirit requiring constant fanning; otherwise, like an external fire which has been covered up, there would be suffocation. As in the case of an ordinary fire, there is required not only fanning and blowing upon so that it may take fuel from the air, but also that it may discharge its sooty vapors into the air. And just as this common external fire is bound to a thick earthy body, because of a common dryness and because of a common form of light, so that which has the liquid of the body as its food is blown upon, supported and nourished by the air; thus that fiery spirit and our soul are similarly bound to the body, making one with it and having its blood as food; it is blown upon, supported and nourished by the airy spirit through inspiration and expiration, so that there is a double nourishment for it, spiritual and corporeal.

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